



# Cavanaugh Macdonald

CONSULTING, LLC

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November 16, 2016

Board of Directors  
Kentucky Retirement Systems  
Perimeter Park West  
1260 Louisville Road  
Frankfort, Kentucky 40601

**Subject: Certification of Actuarial Results**

Dear Members of the Board:

The sixtieth annual actuarial valuation of the Kentucky Employees Retirement System (KERS), the fifty-seventh annual actuarial valuation of the County Employees Retirement System (CERS), and the fifty-eighth annual actuarial valuation of the State Police Retirement System (SPRS) have been completed and the reports prepared. These reports describe the current actuarial condition of the Kentucky Retirement Systems (KRS), determine the calculated employer contribution rates, and analyze fluctuations in these contribution rates.

Under state statute, the Board of Directors must approve the employer contribution rates. These rates are determined actuarially based upon current membership data, plan provisions, and the assumptions and funding policies adopted by the KRS Board. The June 30, 2016 actuarial valuation will be used by the Board of Directors to certify the CERS employer contribution rates for the fiscal year beginning July 1, 2017 and ending June 30, 2018. The June 30, 2016 actuarial valuations for the KERS and SPRS will be used by the Board of Directors for informational purposes only. The KERS and SPRS employer contribution rates for the fiscal years beginning July 1, 2016 and ending June 30, 2018 were certified in the June 30, 2015 actuarial valuations.

**Funding Objectives & Policies**

For each retirement system, KRS administers both a pension and insurance fund to provide for monthly retirement allowances and retiree insurance benefits respectively. The total employer contribution rate is comprised of a contribution to each respective fund.

Relative to the pension fund, a contribution rate has been established which consists of the normal cost and an amortization payment on the unfunded accrued liability (UAL). The amortization of any UAL is made over 30 years from the establishment of the amortization base using a level percent of payroll amortization method. In accordance with the changes to statute made by SB2, the amortization period was reestablished as a closed 30-year period beginning with the June 30, 2013 actuarial valuation. The amortization period will decrease by one each year in the future.

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Overall, the total contribution for the pension fund is expected to remain stable as a percentage of payroll over future years in the absence of benefit improvements and material experience gains or losses.

Relative to the insurance fund, the Board's funding objective is to establish a contribution rate which consists of the normal cost and an amortization payment on the UAL. As with the pension fund, going forward, the UAL will be amortized over a 30-year period beginning June 30, 2013. The amortization period will decrease by one each year going forward.

Administrative expenses of the plans are also included as part of the total contribution. This portion of the funding is expected to remain relatively stable as a percentage of payroll over future years.

KERS, CERS and SPRS have three benefit tiers. Members hired prior to or on August 31, 2008 are in Tier 1. HB1 passed into law in 2008 which introduced Tier 2 for members hired after August 31, 2008 and prior to January 1, 2014. Tier 2 reduced the contribution rates in relationship to Tier 1. SB2 was passed into law in 2013 which introduced Tier 3 for those hired on or after January 1, 2014. Tier 3 is a Cash Balance Plan for pension benefits. The cash balance plan limits the employers' exposure to increased contribution rates due to less than anticipated investment experience.

### **Progress towards Realization of Funding Objectives**

The progress towards achieving the intended funding objectives, relative to both the pension and insurance funds, can be measured by the relationship of actuarial assets of each fund to the actuarial accrued liabilities. This relationship is known as the funding level and in the absence of benefit improvements, should increase over time until it reaches 100%.

In recent years, funding levels for the pension funds have fallen dramatically in response to investment returns less than the actuarially assumed rate, higher than anticipated retirement rates, assumption changes and increasing expenditures for retiree Cost of Living Adjustments (COLA). Within the KERS and SPRS plans, prior employer contribution rate reductions enacted by the State Legislature severely limited the plans ability to correct the declining funding levels. SB2 requires the state to contribute the full actuarially determined employer contribution rates compared to the HB1 phase-in rates which would not have required the full actuarially determined employer contribution rate for many years. As of June 30, 2016 the funding levels for the pension funds are as follows:

<b>System</b>	<b>Pension Funding Level</b>
KERS Non-Hazardous Pension Fund	16.0%
KERS Hazardous Pension Fund	59.7%
CERS Non-Hazardous Pension Fund	59.0%
CERS Hazardous Pension Fund	57.7%
SPRS Pension Fund	30.3%



The Board's funding objective for the insurance funds is to increase the funded level consistently over time. As of June 30, 2016 the funding level for the insurance funds are as follows:

System	Insurance Funding Level
KERS Non-Hazardous Insurance Fund	30.3%
KERS Hazardous Insurance Fund	125.3%
CERS Non-Hazardous Insurance Fund	69.6%
CERS Hazardous Insurance Fund	72.9%
SPRS Insurance Fund	67.2%

### Data

In completing the valuation of these systems, we have relied on data and financial information provided by the Kentucky Retirement Systems. We have reviewed this data for reasonableness, and made some general edit checks to impute certain information that may not have been provided with the original employee data. However, we have not audited this data. Any schedules of trend data over the past ten years or less contained in the Actuarial Section, as well as the Schedule of Funding Progress and Schedule of Employer Contributions in the Financial Section, have been based on valuation reports fully prepared by the actuary for the plan at the time of each valuation.

### Assumptions & Methods

The Board of Directors, in consultation with the actuary, sets the actuarial assumptions and methods used in the valuation. At least once every five years the actuary conducts a thorough review of plan experience for the preceding five years, and then makes recommendations to the Board. The actuarial assumptions and methods used for the funding calculations of the valuation were adopted by the Board on December 4, 2014 and based on the experience investigation report dated April 30, 2014. Since the previous valuation, the assumed rate of return for the KERS Non-Hazardous Retirement System and the State Police Retirement System has been reduced from 7.50% to 6.75%. These assumptions have been adopted by the Board of Directors of the Kentucky Retirement Systems in accordance with the recommendation of the actuary. The next experience study is scheduled to be completed in early 2019 and any adjustments are expected to be reflected in the June 30, 2019 actuarial valuation.

### Closing

The long-term financial health of the three retirement Systems, like all retirement systems, is heavily dependent on two key items: (1) future investment returns and (2) contributions to the System. The System has recently been strengthened due to two reasons. They are: recent legislative action that provides 100% funding of the actuarially determined contribution and the elimination of unfunded ad hoc cost-of-living adjustments for retirees. The cost for providing cost-of-living adjustments for retirees must be prefunded in advance.

The information presented in this letter describes the pertinent issues relative to the valuation. There are no other specific issues that need to be raised beyond these items in order to fairly assess the funded position of the plan as presented in the current valuation.



The funding of the Kentucky Employees Retirement System, the County Employees Retirement System, and the State Police Retirement System has been determined based on the requirements of the Kentucky Revised Statutes and the current funding policies of the Board on the basis that all the actuarial assumptions are met. The funding rates established by the Board are appropriate for this purpose. However, it is up to the state legislature to follow through with the required funding. As noted above, SB2 calls for KERS and SPRS contributions at the actuarially determined rates beginning with fiscal year 2014-2015. It should also be noted that the Retirement Fund of the KERS Non-Hazardous Retirement System and the SPRS Pension Fund are both in critical condition.

Sincerely,

A handwritten signature in blue ink that reads "Todd B. Green" followed by a horizontal line.

Todd B. Green ASA, FCA, MAAA  
Principal and Consulting Actuary

A handwritten signature in blue ink that reads "Alisa Bennett" in a cursive style.

Alisa Bennett, FSA, EA, FCA, MAAA  
Principal and Consulting Actuary



### Summary of June 30, 2016 Actuarial Valuation Results

	KERS Non-Hazardous	KERS Hazardous	CERS Non-Hazardous	CERS Hazardous	SPRS
<b><u>Recommended Contribution Rate (Fiscal Year 2016-2017)</u></b>					
Pension Fund Contribution	41.98%	20.48%	14.48%	22.20%	71.57%
Insurance Fund Contribution	<u>8.41</u>	<u>1.34</u>	<u>4.70</u>	<u>9.35</u>	<u>18.10</u>
Recommended Employer Contribution	50.39%	21.82%	19.18%	31.55%	89.67%
<b><u>Funded Status as of Valuation Date</u></b>					
<b><i>Pension Fund</i></b>					
Actuarial Liability	\$13,224,698,427	\$936,706,126	\$11,076,456,794	\$3,704,456,223	\$775,160,294
Actuarial Value of Assets	2,112,286,498	559,487,184	6,535,372,347	2,139,119,173	234,567,536
Unfunded Actuarial Liability on Actuarial Value of Assets	11,112,411,929	377,218,942	4,541,084,447	1,565,337,050	540,592,758
Funding Level as a % of Actuarial Value of Assets	15.97%	59.73%	59.00%	57.74%	30.26%
Market Value of Assets	1,953,422,354	524,678,968	6,106,186,908	2,003,669,273	217,594,068
Unfunded Actuarial Liability on Market Value of Assets	11,271,276,073	412,027,158	4,970,269,886	1,700,786,950	557,566,226
Funding Level on Market Value of Assets	14.77%	56.01%	55.13%	54.09%	28.07%
<b><i>Insurance Fund</i></b>					
Actuarially Accrued Liability	\$2,456,677,964	\$377,745,230	\$2,988,121,117	\$1,558,818,204	\$257,197,259
Actuarial Value of Assets	743,270,060	473,160,173	2,079,811,055	1,135,784,220	172,703,691
Unfunded Actuarial Liability on Actuarial Value of Assets	1,713,407,904	(95,414,943)	908,310,062	423,033,984	84,493,568
Funding Level as a % of Actuarial Value of Assets	30.26%	125.26%	69.60%	72.86%	67.15%
Market Value of Assets	695,188,649	440,596,305	1,943,756,727	1,062,602,089	161,366,312
Unfunded Actuarial Liability on Market Value of Assets	1,761,489,315	(62,851,075)	1,044,364,390	496,216,115	95,830,947
Funding Level on Market Value of Assets	28.30%	116.64%	65.05%	68.17%	62.74%
<b><u>Member Data</u></b>					
Number of Active Members	37,779	3,959	80,664	9,084	908
Total Annual Payroll (Active Members)	\$1,529,248,873	\$147,563,457	\$2,352,761,794	\$492,850,521	\$45,551,469
Average Annual Pay (Active Members)	\$40,479	\$37,273	\$29,167	\$54,255	\$50,167
Number of Retired Members & Beneficiaries	44,004	3,966	56,339	8,563	1,515
Average Annual Retirement Allowance	\$20,633	\$14,877	\$11,264	\$25,143	\$37,393
Number of Vested Inactive Members	10,399	481	14,357	775	65



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## **Report on the Annual Valuation of the Kentucky Employees Retirement System**

**Prepared as of June 30, 2016**





# Cavanaugh Macdonald

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November 16, 2016

Board of Directors  
Kentucky Retirement Systems  
Perimeter Park West  
1260 Louisville Road  
Frankfort, KY 40601

Dear Members of the Board:

Presented in this report are the results of the annual actuarial valuation of the retirement and insurance benefits provided under the Kentucky Employees Retirement System (KERS). The purpose of the valuation was to measure the System's funding progress and to determine the required employer contribution rates for the fiscal years beginning July 1, 2016 and July 1, 2017. The date of the valuation was June 30, 2016.

The valuation was based upon data, furnished by the Executive Director and the Kentucky Retirement Systems (KRS) staff, concerning active, inactive and retired members along with pertinent financial information. The complete cooperation of the KRS staff in furnishing materials requested is hereby acknowledged with appreciation.

Since the previous valuation, the assumed rate of return for the Non-Hazardous Retirement Plan was changed to 6.75%

To the best of our knowledge, this report is complete and accurate. The valuation was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. The valuation was prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board.

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

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The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the system, and on actuarial assumptions that are, in the aggregate, internally consistent and reasonably based on the actual experience of the system.

Respectfully submitted,

A handwritten signature in blue ink that reads "Todd B. Green".

Todd B. Green ASA, FCA, MAAA  
Principal and Consulting Actuary

A handwritten signature in blue ink that reads "Alisa Bennett".

Alisa Bennett, FSA, EA, FCA, MAAA  
Principal and Consulting Actuary

TBG/AB:kc



## **TABLE OF CONTENTS**

<b><u>Section</u></b>	<b><u>Item</u></b>	<b><u>Page No.</u></b>
I	Summary of Principal Results	1
II	Membership Data	5
III	Assets	7
IV	Comments on Valuation	8
V	Derivation of Experience Gains and Losses	10
VI	Required Contribution Rates	15
VII	Accounting Information	18
<b><u>Schedule</u></b>		
A	Valuation Balance Sheet and Solvency Test	23
B	Development of Actuarial Value of Assets	31
C	Statement of Actuarial Assumptions and Methods	35
D	Summary of Main Benefit and Contribution Provisions	42
E	Detailed Tabulations of the Data	54
F	Sensitivity Analysis	64



**REPORT ON THE ANNUAL VALUATION OF THE  
KENTUCKY EMPLOYEES RETIREMENT SYSTEM**

**PREPARED AS OF JUNE 30, 2016**

**SECTION I – SUMMARY OF PRINCIPAL RESULTS**

This report, prepared as of June 30, 2016, presents the results of the annual actuarial valuation of the retirement and insurance benefits provided under the System. For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results, broken down between non-hazardous and hazardous members, are summarized in the following table.

**SUMMARY OF PRINCIPAL RESULTS**

	KERS Non-Hazardous		KERS Hazardous		KERS Totals	
	6/30/2016	6/30/2015	6/30/2016	6/30/2015	6/30/2016	6/30/2015
<b>Contributions for next fiscal year:</b>						
Retirement	41.98%	38.93%	20.48%	21.08%		
Insurance	<u>8.41</u>	<u>8.35</u>	<u>1.34</u>	<u>2.74</u>	N/A	N/A
Total	50.39%	47.28%	21.82%	23.82%		
<b>Funded status as of valuation date:</b>						
Retirement						
Actuarial accrued liability	\$13,224,698,427	\$12,359,672,849	\$936,706,126	\$895,433,387	\$14,161,404,553	\$13,255,106,236
Actuarial value of assets	2,112,286,498	2,350,989,940	559,487,184	556,687,757	2,671,773,682	2,907,677,697
Unfunded liability on actuarial value of assets	11,112,411,929	10,008,682,909	377,218,942	338,745,630	11,489,630,871	10,347,428,539
Funded ratio on actuarial value of assets	15.97%	19.02%	59.73%	62.17%	18.87%	21.94%
Market value of assets	\$1,953,422,354	\$2,307,858,072	\$524,678,968	\$550,120,310	\$2,478,101,322	\$2,857,978,382
Unfunded liability on market value of assets	11,271,276,073	10,051,814,777	412,027,158	345,313,077	11,683,303,231	10,397,127,854
Funded ratio on market value of assets	14.77%	18.67%	56.01%	61.44%	17.50%	21.56%
Insurance						
Actuarial accrued liability	\$2,456,677,964	\$2,413,705,252	\$377,745,230	\$374,904,234	\$2,834,423,194	\$2,788,609,486
Actuarial value of assets	743,270,060	695,018,262	473,160,173	451,514,191	1,216,430,233	1,146,532,453
Unfunded liability on actuarial value of assets	1,713,407,904	1,718,686,990	(95,414,943)	(76,609,957)	1,617,992,961	1,642,077,033
Funded ratio on actuarial value of assets	30.26%	28.79%	125.26%	120.43%	42.92%	41.11%
Market value of assets	\$695,188,649	\$687,684,080	\$440,596,305	\$441,626,285	\$1,135,784,954	\$1,129,310,365
Unfunded liability on market value of assets	1,761,489,315	1,726,021,172	(62,851,075)	(66,722,051)	1,698,638,240	1,659,299,121
Funded ratio on market value of assets	28.30%	28.49%	116.64%	117.80%	40.07%	40.50%
<b>Demographic data as of valuation date:</b>						
Number of retired participants and beneficiaries	44,004	42,269	3,966	3,758	47,970	46,027
Number of vested former members	10,399	9,806	481	460	10,880	10,266
Number of former members due a refund	38,641	38,454	4,444	4,094	43,085	42,548
Number of active members	37,779	39,056	3,959	3,886	41,738	42,942
Total salary	\$1,529,248,873	\$1,544,234,409	\$147,563,457	\$128,680,130	\$1,676,812,330	\$1,672,914,539
Average salary	\$40,479	\$39,539	\$37,273	\$33,114	\$40,175	\$38,958



The Kentucky Employees Retirement System is a defined benefit pension fund that provides pensions and health care coverage for employees of state government, non-teaching staff at regional state supported universities, local health departments, regional mental health/mental retardation agencies, and other quasi-state agencies. The Kentucky Employees Retirement System includes both non-hazardous and hazardous duty benefits. This report presents the results of the June 30, 2016 actuarial funding valuation for both the Retirement Plan and the Insurance Fund. The primary purpose of performing the actuarial funding valuations are to:

- Calculate the actuarially determined contribution rates for the fiscal years beginning July 1, 2016 and July 1, 2017 for both the Retirement Plan and the Insurance Fund.
- Determine the experience of the System since the last valuation date.
- Disclose asset and liability measures as of the valuation date.
- Analyze and report on trends in contributions, assets, and liabilities over the past several years.

Since the previous valuation there were no changes to the plan provisions. The discount rate for the Non-Hazardous Pension Plan was changed to 6.75%. The discount rate remains 7.50% for the Non-Hazardous Insurance Plan. The actuarial valuation results provide “snapshot” view the System’s financial condition on June 30, 2016. Actuarial gains and losses result when actuarial experience of the plan (such as asset return, pay increases, turnover, deaths, etc.) is different from the expected by the actuarial assumptions.

### **Non-Hazardous**

The Retirement Plan’s Unfunded Actuarial Accrued Liability (UAAL) was expected to be \$10,261.1 million taking into account contributions from both the employer and members of \$614.8 million. The actual UAAL was \$11,112.4 million. The increase of \$851.3 million was due to the change in discount rate offset by an actuarial gain due to actual experience different than what was anticipated by the assumptions. The Insurance Fund’s UAAL was expected to be \$1,748.1 million taking into account expected employer and member contributions of \$132.6 million. The actual UAAL was \$1,713.4 million. The decrease in the UAAL of \$34.7 million was due to an actuarial gain due to actuarial experience different than what was anticipated by the assumptions.

The remaining amortization period of the UAAL of both the Pension and Insurance Funds is 27-years as of June 30, 2016. Detailed analysis of the gains and losses are presented in Section V of the report.

As of June 30, 2016 the Pension and Insurance Funds had net assets of \$1,953,422,354 and \$695,188,649 respectively. The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the actuarially determined contribution. The asset valuation method which recognizes the annual unexpected portion of market value investment returns over a five-



year period, attempts to dampen the effect of market volatility. The resulting amount is called the “actuarial value of assets” and is utilized to determine the actuarial valuation results. In this year’s actuarial valuation, the actuarial value of assets as of June 30, 2016 was \$2,112,286,498 and \$743,270,060 respectively for the Pension and Insurance Funds.

On a market basis, the estimated rate of return was (1.1)% and (0.6)% respectively for the Pension and Insurance Funds, assuming all cash flows occur in the middle of the year. Due to better than assumed prior returns on the market value of assets the net rate of return measured on the actuarial value of assets was 4.3% and 5.3% respectively for both the Pension and Insurance Funds. Please see Section III and Schedule B of this report for more detailed information on the market and actuarial value of assets.

### **Hazardous**

The Retirement Plan’s Unfunded Actuarial Accrued Liability (UAAL) was expected to be \$344.6 million taking into account contributions from both the employer and members of \$38.8 million. The actual UAAL was \$377.2 million. The increase of \$32.6 million was due to an actuarial loss due to actual experience different than what was anticipated by the assumptions. The Insurance Funds UAAL was expected to be (\$77.9) million taking into account expected employer and member contributions of \$4.0 million. The actual UAAL was (\$95.4) million. The decrease in the UAAL of \$17.5 million was due to an actuarial gain due to actuarial experience different than what was anticipated by the assumptions.

The remaining amortization period of the UAAL of both the Pension and Insurance Funds is 27-years as of June 30, 2016. Detailed analysis of the gains and losses are presented in Section V of the report.

As of June 30, 2016 the Pension and Insurance Funds had net assets of \$524,678,968 and \$440,596,306 respectively. The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the actuarially determined contribution. The asset valuation method which recognizes the annual unexpected portion of market value investment returns over a five-year period, attempts to dampen the effect of market volatility. The resulting amount is called the “actuarial value of assets” and is utilized to determine the actuarial valuation results. In this year’s actuarial valuation, the actuarial value of assets as of June 30, 2016 was \$559,487,184 and \$473,160,173 respectively for the Pension and Insurance Funds.

On a market basis, the estimated rate of return was (0.3)% and (0.2)% respectively for the Pension and Insurance Funds, assuming all cash flows occur in the middle of the year. Due to better than assumed prior returns on the market value of assets the net rate of return measured on the actuarial value of assets was 5.0% and 4.8% respectively for both the Pension and Insurance Funds. Please see Section III and Schedule B of this report for more detailed information on the market and actuarial value of assets.



Schedule F provides sensitivity analysis for three different sets of economic assumptions; the discount rate assumption, the inflation assumption, and the payroll growth assumption. Two assumption change scenarios are presented for each economic assumption. The results of the economic assumption change scenarios are presented along with the valuation results for comparison.

The long-term financial health of this retirement System, like all retirement systems, is heavily dependent on two key items: (1) future investment returns and (2) contributions to the System. The System has recently been strengthened due to two reasons. They are, recent legislative action that provides 100% funding of the actuarially determined contribution and the elimination of unfunded ad hoc cost-of-living adjustments for retirees. The cost for providing cost-of-living adjustments for retirees must be prefunded in advance.



**SECTION II – MEMBERSHIP DATA**

Data regarding the membership of the System for use as a basis for the valuation were furnished by the System's office. The following tables summarize the membership of the system as of June 30, 2016 upon which the valuation was based. Detailed tabulations of the data are given in Schedule E.

**Active Members**

Employee Group	Number	Payroll	Group Averages		
			Salary	Age	Service
Non-Hazardous	37,779	\$1,529,248,873	\$40,479	45.1	10.7
Hazardous	3,959	147,563,457	37,273	40.4	7.5
Total in KERS	41,738	\$1,676,812,330	\$40,175	44.6	10.4

The following tables show a six-year history of active member valuation data.

**SCHEDULE OF NON-HAZARDOUS KERS ACTIVE MEMBER VALUATION DATA**

Valuation Date	Number	Annual Payroll	Annual Average Pay	% Increase in Average Pay
6/30/2011	46,617	\$1,731,632,748	\$37,146	(3.6%)
6/30/2012	42,196	1,644,896,681	38,982	4.9
6/30/2013	42,226	1,644,408,698	38,943	(0.1)
6/30/2014	40,365	1,577,496,447	39,081	0.4
6/30/2015	39,056	1,544,234,409	39,539	1.2
6/30/2016	37,779	1,529,248,873	40,479	2.4

**SCHEDULE OF HAZARDOUS KERS ACTIVE MEMBER VALUATION DATA**

Valuation Date	Number	Annual Payroll	Annual Average Pay	% Increase in Average Pay
6/30/2011	4,291	\$133,053,792	\$31,008	(7.3%)
6/30/2012	4,086	131,976,754	32,300	4.2
6/30/2013	4,127	132,015,368	31,988	(1.0)
6/30/2014	4,024	129,076,038	32,077	0.3
6/30/2015	3,886	128,680,130	33,114	3.2
6/30/2016	3,959	147,563,457	37,273	12.6



The following tables show the number and annual retirement allowances payable to retired members and their beneficiaries on the roll of the Retirement System as of the valuation date as well as certain group averages.

**Non-Hazardous Retired Lives**

Type of Benefit Payment	Number	Annual Benefits*	Group Averages	
			Benefit	Age
Retiree	37,327	\$816,466,272	\$21,873	68.5
Disability	1,970	25,546,625	12,968	65.0
Beneficiary	4,707	65,921,441	14,005	70.3
Total in KERS	44,004	\$907,934,338	\$20,633	68.6

\* Does not include number and annual benefits for those members included in the hazardous system who are also receiving benefits from the non-hazardous system. There were 2,274 members in the hazardous system also receiving an annual benefit from the non-hazardous System. Total annual benefits for these members is \$20,165,642.

**Hazardous Retired Lives**

Type of Benefit Payment	Number	Annual Benefits	Group Averages	
			Benefit	Age
Retiree	3,404	\$53,576,505	\$15,739	64.1
Disability	149	1,323,120	8,880	59.1
Beneficiary	413	4,101,324	9,931	64.8
Total in KERS	3,966	\$59,000,949	\$14,877	63.9

This valuation also includes 53,965 inactive members (49,040 Non-Hazardous and 4,925 Hazardous; of which 10,399 Non-Hazardous are vested and 481 Hazardous are vested).



**SECTION III – ASSETS**

- As of June 30, 2016 the total market value of assets amounted to \$3,613,886,276 as shown in the following table. The Insurance assets include both the amount in the health care trust and the amount in the 401(h) account in the pension trust established to meet the requirements of HB1.

**MARKET VALUE OF ASSETS BY FUND  
AS OF JUNE 30, 2016**

Member Group	Retirement	Insurance	KERS Total
Non-Hazardous	\$1,953,422,354	\$695,188,649	\$2,648,611,003
Hazardous	<u>524,678,968</u>	<u>440,596,305</u>	<u>965,275,273</u>
Total	\$2,478,101,322	\$1,135,784,954	\$3,613,886,276

- The five-year smoothed market related actuarial value of assets used for the current valuation was \$3,888,203,915. Schedule B shows the development of the actuarial value of assets as of June 30, 2016. The following table shows the actuarial value of assets allocated among member groups.

**COMPARISON OF ACTUARIAL VALUE OF ASSETS**

	June 30, 2016	June 30, 2015
<b>Retirement</b>		
Non-Hazardous	\$ 2,112,286,498	\$ 2,350,989,940
Hazardous	<u>559,487,184</u>	<u>556,687,757</u>
Total	\$ 2,671,773,682	\$ 2,907,677,697
<b>Insurance</b>		
Non-Hazardous	\$ 743,270,060	\$ 695,018,262
Hazardous	<u>473,160,173</u>	<u>451,514,191</u>
Total	\$ 1,216,430,233	\$ 1,146,532,453
<b>KERS Total</b>		
Non-Hazardous	\$ 2,855,556,558	\$ 3,046,008,202
Hazardous	<u>1,032,647,357</u>	<u>1,008,201,948</u>
Total	\$ 3,888,203,915	\$ 4,054,210,150



## **SECTION IV - COMMENTS ON VALUATION**

Schedule A of this report contains the valuation balance sheets which show the present and prospective assets and liabilities of the System as of June 30, 2016. Separate balance sheets are shown for each employee group as well as in total for Retirement and Insurance. Since the previous valuation, the discount rate for the Non-Hazardous Plan has been changed to 6.75%.

### **Retirement**

1. The total valuation balance sheet on account of retirement benefits shows that the System has total prospective retirement benefit liabilities of \$15,592,171,639, of which \$10,219,120,158 is for the prospective benefits payable on account of present retired members and beneficiaries of deceased members, \$439,530,185 is for the prospective benefits payable on account of present inactive members, and \$4,933,521,296 is for the prospective benefits payable on account of present active members. Against these retirement benefit liabilities the System has a total present actuarial value of assets of \$2,671,773,682 as of June 30, 2016. The difference of \$12,920,397,957 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of retirement benefits. Of this amount, \$803,448,745 is the present value of future contributions expected to be made by members, and the balance of \$12,116,949,212 represents the present value of future contributions payable by the employers.
2. The employers' contributions to the System on account of retirement benefits consist of normal contributions, accrued liability contributions and contributions for administrative expenses. The valuation indicates that employer normal contributions at the rate of 4.25% of payroll for non-hazardous members and 5.85% of payroll for hazardous members are required to fund the continuing benefit accruals for the average active member of KERS.
3. Prospective employer normal contributions on account of retirement benefits at the above rates have a present value of \$627,318,341. When this amount is subtracted from \$12,116,949,212, which is the present value of the total future contributions to be made by the employers, there remains \$11,489,630,871 as the amount of future accrued liability contributions.
4. For non-hazardous members, it is recommended that the accrued liability contribution rate payable by the State on account of retirement benefits be set at 37.05% of payroll. For hazardous members, it is recommended that the accrued liability contribution rate payable by the State on account of retirement benefits be set at 14.04% of payroll. These rates are sufficient to liquidate the unfunded accrued liability of \$11,112,411,929 for non-hazardous members and \$377,218,942 for hazardous members over 27 years on the assumption that the aggregate payroll for non-hazardous and hazardous members will increase by 4.00% each year.
5. The contribution rate for administrative expenses is determined to be 0.68% of payroll for non-hazardous members and 0.59% of payroll for hazardous members.



## Insurance

1. The total valuation balance sheet on account of insurance benefits shows that the System has total prospective insurance benefit liabilities of \$3,181,272,329, of which \$1,569,979,955 is for the prospective benefits payable on account of present retired members and beneficiaries of deceased members, \$142,016,967 is for the prospective benefits payable on account of present inactive members, and \$1,469,275,407 is for the prospective benefits payable on account of present active members. Against these retirement benefit liabilities the System has a total present actuarial value of assets of \$1,216,430,233 as of June 30, 2016. The difference of \$1,964,842,096 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of retirement benefits. Of this amount, \$55,569,373 is the present value of future contributions expected to be made by members, and the balance of \$1,909,272,723 represents the present value of future contributions payable by the employers.
2. The employers' contributions to the System on account of insurance benefits consist of normal contributions, accrued liability contributions and contributions for administrative expenses. The valuation indicates that employer normal contributions at the rate of 2.19% of payroll for non-hazardous members and 4.83% of payroll for hazardous members are required to fund the continuing benefit accruals for the average active member of KERS.
3. Prospective employer normal contributions on account of insurance benefits at the above rates have a present value of \$291,279,762. When this amount is subtracted from \$1,909,272,723, which is the present value of the total future contributions to be made by the employers, there remains \$1,617,992,961 as the amount of future accrued liability contributions.
4. For non-hazardous members, it is recommended that the accrued liability contribution rate payable by the State on account of insurance benefits be set at 6.17% of payroll. For hazardous members, it is recommended that the accrued liability contribution rate payable by the State on account of insurance benefits be set at (3.56%) of payroll. These rates are sufficient to liquidate the unfunded accrued liability of \$1,713,407,904 for non-hazardous members and \$(95,414,943) for hazardous members over 27 years on the assumption that the aggregate payroll for non-hazardous and hazardous members will increase by 4.00% each year.
5. The contribution rate for administrative expenses is determined to be 0.05% of payroll for non-hazardous members and 0.07% of payroll for hazardous members.



**SECTION V – DERIVATION OF EXPERIENCE GAINS AND LOSSES**

Actual experience will never (except by coincidence) coincide exactly with assumed experience. It is assumed that gains and losses will be in balance over a period of years, but sizable year to year fluctuations are common. Detail on the derivation of the experience gain (loss) for the year ended June 30, 2016 is shown below (\$ millions).

**Experience Gain/(Loss)  
Retirement Benefits**

		Non-Hazardous Group		Hazardous Group		Total
(1)	UAAL* as of 6/30/15	\$ 10,008.7		\$ 338.7		\$ 10,347.4
(2)	Normal cost from last valuation	129.9		19.3		149.2
(3)	Contributions	614.8		38.8		653.6
(4)	Interest accrual: [(1) + (2)] x .075 - (3) x .0375	737.3		25.4		762.7
(5)	Expected UAAL before changes: (1) + (2) - (3) + (4)	\$ 10,261.1		\$ 344.6		\$ 10,605.7
(6)	Change due to new actuarial assumption or methods	(903.0)		0.0		(903.0)
(7)	Expected UAAL after changes: (5) - (6)	\$ 11,164.1		\$ 344.6		\$ 11,508.7
(8)	Actual UAAL as of 6/30/16	\$ 11,112.4		\$ 377.2		\$ 11,489.6
(9)	Gain/(loss): (7) - (8)	\$ 51.7		\$ (32.6)		\$ 19.1
(10)	Accrued liabilities as of 6/30/15	\$ 12,359.7		\$ 895.4		\$ 13,255.1
(11)	Gain/(loss) as percent of actuarial accrued liabilities at start of year	0.4%		(3.6%)		0.1%

\*Unfunded actuarial accrued liability



**Experience Gain/(Loss)  
Insurance Benefits**

	Non-Hazardous Group	Hazardous Group	Total
(1) UAAL* as of 6/30/15	\$ 1,718.7	\$ (76.6)	\$ 1,642.1
(2) Normal cost from last valuation	40.0	8.1	48.1
(3) Expected contributions	<u>132.6</u>	<u>4.0</u>	<u>136.6</u>
(4) Interest accrual: [(1) + (2) - (3)] x .075	122.0	(5.4)	116.6
(5) Expected UAAL before changes: (1) + (2) - (3) + (4)	\$ 1,748.1	\$ (77.9)	\$ 1,670.2
(6) Change due to new actuarial assumption or methods	0.0	0.0	0.0
(7) Expected UAAL after changes: (5) - (6)	\$ 1,748.1	\$ (77.9)	\$ 1,670.2
(8) Actual UAAL as of 6/30/16	\$ 1,713.4	\$ (95.4)	\$ 1,618.0
(9) Gain/(loss): (7) - (8)	\$ 34.7	\$ 17.5	\$ 52.2
(10) Accrued liabilities as of 6/30/15	\$ 2,413.7	\$ 374.9	\$ 2,788.6
(11) Gain/(loss) as percent of actuarial accrued liabilities at start of year	1.4%	4.7%	1.9%

\* *Unfunded actuarial accrued liability*



**NON-HAZARDOUS KERS MEMBERS  
ANALYSIS OF FINANCIAL EXPERIENCE**

**Gains & Losses in Accrued Liabilities  
Resulting from Difference Between  
Assumed Experience & Actual Experience  
(\$ Millions)**

Type of Activity	Retirement \$ Gain (or Loss) For Year Ending 6/30/16	Insurance \$ Gain (or Loss) For Year Ending 6/30/16
<b>Age &amp; Service Retirements.</b> If members retire at older ages, there is a gain. If younger ages, a loss.	\$ (34.0)	\$ 5.4
<b>Disability Retirements.</b> If disability claims are less than assumed, there is a gain. If more claims, a loss.	(4.0)	(0.3)
<b>Death-in Service Benefits.</b> If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	(0.1)	(1.0)
<b>Withdrawal From Employment.</b> If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	91.9	12.9
<b>Pay or Claims Increases.</b> If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss. For insurance, smaller claims increases than assumed creates a gain; larger, a loss.	34.2	75.6
<b>New Members.</b> Additional unfunded accrued liability will produce a loss.	(10.2)	(26.2)
<b>Investment Income.</b> If there is a greater investment income than assumed, there is a gain. If less income, a loss.	(70.9)	(15.7)
<b>Death or Waiver After Retirement.</b> If retired members live longer than assumed, there is a loss. If not as long, a gain. If retired members receiving health benefits later waive coverage, there is a gain.	43.3	27.3
<b>Other.</b> Miscellaneous gains and losses resulting from changes in valuation software, data adjustments, timing of financial transactions, insurance election changes, etc.	<u>1.5</u>	<u>(43.3)</u>
<b>Gain (or Loss) During Year From Financial Experience</b>	\$ 51.7	\$ 34.7
<b>Non-Recurring Items.</b> Adjustments for plan amendments, assumption changes, method changes and data corrections	<u>(903.0)</u>	<u>0.0</u>
<b>Composite Gain (or Loss) During Year</b>	\$ (851.3)	\$ 34.7



**HAZARDOUS KERS MEMBERS  
ANALYSIS OF FINANCIAL EXPERIENCE**

**Gains & Losses in Accrued Liabilities  
Resulting from Difference Between  
Assumed Experience & Actual Experience  
(\$ Millions)**

Type of Activity	Retirement \$ Gain (or Loss) For Year Ending 6/30/16	Insurance \$ Gain (or Loss) For Year Ending 6/30/16
<b>Age &amp; Service Retirements.</b> If members retire at older ages, there is a gain. If younger ages, a loss.	\$ (15.6)	\$ (0.5)
<b>Disability Retirements.</b> If disability claims are less than assumed, there is a gain. If more claims, a loss.	0.0	0.1
<b>Death-in Service Benefits.</b> If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	0.0	(0.4)
<b>Withdrawal From Employment.</b> If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	14.3	3.9
<b>Pay or Claims Increases.</b> If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss. For insurance, smaller claims increases than assumed creates a gain; larger, a loss.	(20.3)	14.0
<b>New Members.</b> Additional unfunded accrued liability will produce a loss.	(6.1)	(3.9)
<b>Investment Income.</b> If there is a greater investment income than assumed, there is a gain. If less income, a loss.	(14.4)	(12.1)
<b>Death or Waiver After Retirement.</b> If retired members live longer than assumed, there is a loss. If not as long, a gain. If retired members receiving health benefits later waive coverage, there is a gain.	7.4	6.0
<b>Other.</b> Miscellaneous gains and losses resulting from changes in valuation software, data adjustments, timing of financial transactions, insurance election changes, etc.	<u>2.1</u>	<u>10.4</u>
<b>Gain (or Loss) During Year From Financial Experience</b>	\$ (32.6)	\$ 17.5
<b>Non-Recurring Items.</b> Adjustments for plan amendments, assumption changes, method changes and data corrections	<u>0.0</u>	<u>0.0</u>
<b>Composite Gain (or Loss) During Year</b>	\$ (32.6)	\$ 17.5



**TOTAL KERS MEMBERS  
ANALYSIS OF FINANCIAL EXPERIENCE**

**Gains & Losses in Accrued Liabilities  
Resulting from Difference Between  
Assumed Experience & Actual Experience  
(\$ Millions)**

Type of Activity	Retirement \$ Gain (or Loss) For Year Ending 6/30/16	Insurance \$ Gain (or Loss) For Year Ending 6/30/16
<b>Age &amp; Service Retirements.</b> If members retire at older ages, there is a gain. If younger ages, a loss.	\$ (49.6)	\$ 4.9
<b>Disability Retirements.</b> If disability claims are less than assumed, there is a gain. If more claims, a loss.	(4.0)	(0.2)
<b>Death-in Service Benefits.</b> If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	(0.1)	(1.4)
<b>Withdrawal From Employment.</b> If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	106.2	16.8
<b>Pay or Claims Increases.</b> If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss. For insurance, smaller claims increases than assumed creates a gain; larger, a loss.	13.9	89.6
<b>New Members.</b> Additional unfunded accrued liability will produce a loss.	(16.3)	(30.1)
<b>Investment Income.</b> If there is a greater investment income than assumed, there is a gain. If less income, a loss.	(85.3)	(27.8)
<b>Death or Waiver After Retirement.</b> If retired members live longer than assumed, there is a loss. If not as long, a gain. If retired members receiving health benefits later waive coverage, there is a gain.	50.7	33.3
<b>Other.</b> Miscellaneous gains and losses resulting from changes in valuation software, data adjustments, timing of financial transactions, insurance election changes, etc.	<u>3.6</u>	<u>(32.9)</u>
<b>Gain (or Loss) During Year From Financial Experience</b>	\$ 19.1	\$ 52.2
<b>Non-Recurring Items.</b> Adjustments for plan amendments, assumption changes, method changes and data corrections	<u>(903.0)</u>	<u>0.0</u>
<b>Composite Gain (or Loss) During Year</b>	\$ (883.9)	\$ 52.2



## SECTION VI – REQUIRED CONTRIBUTION RATES

The valuation balance sheet gives the basis for determining the percentage rates for contributions to be made by employers to the Retirement System. The following tables show the rates of contribution payable by employers as determined from the present valuation. These rates are for informational purposes only.

### Required Contribution Rates Non-Hazardous Retirement

Contribution Rate for	% of Payroll
A. Normal Cost:	
(1) Service retirement benefits	8.89%
(2) Disability benefits	0.27%
(3) Survivor benefits	0.09%
(4) Total	<u>9.25%</u>
B. Member Contributions	5.00%
C. Employer Normal Cost: [A(4) - B]	4.25%
D. Administrative Expenses	0.68%
Unfunded Actuarial Accrued Liability	
E. Contributions*:	37.05%
F. Total Recommended Employer Contribution Rate: [C+D+E]	41.98%

*\*Based on 27 year amortization of the UAAL from June 30, 2016*



**Required Contribution Rates  
Hazardous Retirement**

<b>Contribution Rate for</b>	<b>% of Payroll</b>
A. Normal Cost:	
(1) Service retirement benefits	13.36%
(2) Disability benefits	0.33%
(3) Survivor benefits	0.16%
(4) Total	<u>13.85%</u>
B. Member Contributions	8.00%
C. Employer Normal Cost: [A(4) - B]	5.85%
D. Administrative Expenses	0.59%
E. Unfunded Actuarial Accrued Liability Contributions*:	14.04%
F. Total Recommended Employer Contribution Rate: [C+D+E]	20.48%

*\*Based on 27 year amortization of the UAAL from June 30, 2016*



**Required Contribution Rates  
Non-Hazardous Insurance**

<b>Contribution for</b>	<b>% of Payroll</b>
A. Normal Cost:	2.51%
B. Member Contributions*	0.32%
C. Employer Normal Cost: [A - B]	2.19%
D. Administrative Expenses	0.05%
E. Unfunded Actuarial Accrued Liability**:	6.17%
F. Total Recommended Employer Contribution Rate: [C+D+E]	8.41%

*\*The liabilities are net of retiree contributions towards their healthcare.*

*\*\* Based on 27 year amortization of the UAAL from June 30, 2016*

**Required Contribution Rates  
Hazardous Insurance**

<b>Contribution for</b>	<b>% of Payroll</b>
A. Normal Cost:	5.29%
B. Member Contributions*	0.46%
C. Employer Normal Cost: [A - B]	4.83%
D. Administrative Expenses	0.07%
E. Unfunded Actuarial Accrued Liability**:	(3.56%)
F. Total Recommended Employer Contribution Rate: [C+D+E]	1.34%

*\*The liabilities are net of retiree contributions towards their healthcare.*

*\*\* Based on 27 year amortization of the UAAL from June 30, 2016*



**SECTION VII - ACCOUNTING INFORMATION**

Governmental Accounting Standards Board Statements (GASB) 43, 45, 67 and 68 set forth certain items of required supplementary information to be disclosed in the financial statements of the System and the employer. The information required under GASB 67 and 68 will be issued in separate reports. We are providing the retirement benefit information for information purposes only. One such item is a distribution of the number of employees by type of membership, as follows:

**NUMBER OF ACTIVE AND RETIRED MEMBERS  
AS OF JUNE 30, 2016**

GROUP	NUMBER		
	Non-Hazardous*	Hazardous	Total
Retirees and beneficiaries currently receiving benefits	44,004	3,966	47,970
Terminated employees entitled to benefits but not yet receiving benefits	49,040	4,925	53,965
Active Members	<u>37,779</u>	<u>3,959</u>	<u>41,738</u>
Total	130,823	12,850	143,673

*\* Does not include members included in the hazardous system who are also receiving benefits from the non-hazardous system. There were 2,274 members in in the hazardous system also receiving an annual benefit from the non-hazardous System*

Another such item is the Schedule of Funding Progress for retirement and insurance benefits separately as shown in the following tables. Please note that for the retiree health care liabilities of those under age 65, the current premium charged by the Kentucky Employees' Health Plan (KEHP) is used as the base cost and is projected forward using the health care trend assumption. No implicit rate subsidy is calculated or recognized as the implicit rate subsidy is deemed the responsibility of the KEHP. Under Actuarial Standard of Practice No. 6 (ASOP No. 6), aging subsidies (or implicit rate subsidies) should be recognized, as the differences in health care utilization and cost due to age have been demonstrated and well quantified. The impact of aging on a valuation's results can be as significant as the use of mortality, trend, and discounting. It has been the long-standing position that the responsibility for compliance with GASB Statement No. 43, when it relates to KEHP implicit subsidies, rests with KEHP, not KRS, as KRS has no operational authority over KEHP. As such, KEHP implicit subsidies are excluded from the OPEB valuation process of the Retiree Medical Plan. As GASB 74 and 75 prohibit such a deviation from ASOP No. 6, additional consideration to the current treatment of KEHP implicit rate subsidies may be needed in the future. The estimated impact of KEHP implicit subsidies to the actuarial accrued liability is an increase of \$327,100,333 for KERS non-hazardous and \$45,961,457 for KERS hazardous.



**RETIREMENT BENEFITS  
SCHEDULE OF FUNDING PROGRESS**

Actuarial Valuation Date	Value of Plan Assets ( a )	Actuarial Accrued Liability (AAL) Entry Age ( b )	Unfunded AAL (UAAL) ( b - a )	Funded Ratio ( a / b )	Covered Payroll ( c )	UAAL as a Percentage of Covered Payroll ( ( b - a ) / ( c ) )
<b>Non-Hazardous Members</b>						
6/30/2011	\$ 3,726,986,087	\$ 11,182,142,032	\$ 7,455,155,945	33.3%	\$ 1,731,632,748	430.5%
6/30/2012	3,101,316,738	11,361,048,136	8,259,731,398	27.3	1,644,896,681	502.1
6/30/2013	2,636,122,852	11,386,602,159	8,750,479,307	23.2	1,644,408,698	532.1
6/30/2014	2,423,956,716	11,550,110,224	9,126,153,508	21.0	1,577,496,447	578.5
6/30/2015*	2,350,989,940	12,359,672,849	10,008,682,909	19.0	1,544,234,409	648.1
6/30/2016**	2,112,286,498	13,224,698,427	11,112,411,929	16.0	1,529,248,873	726.7
<b>Hazardous Members</b>						
6/30/2011	\$ 510,748,505	\$ 721,293,444	\$ 210,544,939	70.8%	\$ 133,053,792	158.2%
6/30/2012	497,226,296	752,699,457	255,473,161	66.1	131,976,754	193.6
6/30/2013	505,656,808	783,980,594	278,323,786	64.5	132,015,368	210.8
6/30/2014	527,897,261	816,850,063	288,952,802	64.6	129,076,038	223.9
6/30/2015*	556,687,757	895,433,387	338,745,630	62.2	128,680,130	263.2
6/30/2016	559,487,184	936,706,126	377,218,942	59.7	147,563,457	255.6
<b>Total KERS Members</b>						
6/30/2011	\$ 4,237,734,592	\$ 11,903,435,476	\$ 7,665,700,884	35.6%	\$ 1,864,686,540	411.1%
6/30/2012	3,598,543,034	12,113,747,593	8,515,204,559	29.7	1,776,873,435	479.2
6/30/2013	3,141,779,660	12,170,582,752	9,028,803,092	25.8	1,776,424,066	508.3
6/30/2014	2,951,853,977	12,366,960,287	9,415,106,310	23.9	1,706,572,485	551.7
6/30/2015	2,907,677,697	13,255,106,236	10,347,428,539	21.9	1,672,914,539	618.5
6/30/2016	2,671,773,682	14,161,404,553	11,489,630,871	18.9	1,676,812,330	685.2

\* Discount rate changed from 7.75% to 7.50%

\*\* Discount rate changed from 7.50% to 6.75%



**INSURANCE BENEFITS  
SCHEDULE OF FUNDING PROGRESS**

Actuarial Valuation Date	Value of Plan Assets ( a )	Actuarial Accrued Liability (AAL) Entry Age ( b )	Unfunded AAL (UAAL) ( b - a )	Funded Ratio ( a / b )	Covered Payroll ( c )	UAAL as a Percentage of Covered Payroll ( ( b - a ) / ( c ) )
<b>Non-Hazardous Members</b>						
6/30/2011	\$ 451,620,442	\$ 4,280,089,633	\$ 3,828,469,191	10.6%	\$ 1,731,632,748	221.1%
6/30/2012	446,080,511	3,125,330,157	2,679,249,646	14.3	1,644,896,681	162.9
6/30/2013*	497,584,327	2,128,754,134	1,631,169,807	23.4	1,644,408,698	99.2
6/30/2014	621,236,646	2,226,759,925	1,605,523,279	27.9	1,577,496,447	101.8
6/30/2015**	695,018,262	2,413,705,252	1,718,686,990	28.8	1,544,234,409	111.3
6/30/2016	743,270,060	2,456,677,964	1,713,407,904	30.3	1,529,248,873	112.0
<b>Hazardous Members</b>						
6/30/2011	\$ 329,961,615	\$ 507,058,767	\$ 177,097,152	65.1%	\$ 133,053,792	133.1%
6/30/2012	345,573,948	384,592,406	39,018,458	89.9	131,976,754	29.6
6/30/2013	370,774,403	385,517,675	14,743,272	96.2	132,015,368	11.2
6/30/2014	419,395,867	396,986,820	(22,409,047)	105.6	129,076,038	(17.4)
6/30/2015**	451,514,191	374,904,234	(76,609,957)	120.4	128,680,130	(59.5)
6/30/2016	473,160,173	377,745,230	(95,414,943)	125.3	147,563,457	(64.7)
<b>Total KERS Members</b>						
6/30/2011	\$ 781,582,057	\$ 4,787,148,400	\$ 4,005,566,343	16.3%	\$ 1,864,686,540	214.8%
6/30/2012	791,654,459	3,509,922,563	2,718,268,104	22.6	1,776,873,435	153.0
6/30/2013	868,358,730	2,514,271,809	1,645,913,079	34.5	1,776,424,066	92.7
6/30/2014	1,040,632,513	2,623,746,745	1,583,114,232	39.7	1,706,572,485	92.8
6/30/2015	1,146,532,453	2,788,609,486	1,642,077,033	41.1	1,672,914,539	98.2
6/30/2016	1,216,430,233	2,834,423,194	1,617,992,961	42.9	1,676,812,330	96.5

\* Discount rate changed from 4.50% to 7.75%

\*\* Discount rate changed from 7.75% to 7.50%



**INSURANCE BENEFITS  
SCHEDULE OF EMPLOYER CONTRIBUTIONS**

<b>Year Ended</b>	<b>Annual Required Contribution</b>	<b>Employer Contributions</b>	<b>Percentage Contributed</b>
<b>Non-Hazardous Members</b>			
June 30, 2011	\$ 294,897,813	\$ 129,335,552	43.9%
June 30, 2012	297,904,224	156,057,216	52.4%
June 30, 2013	286,143,134	165,330,557	57.8%
June 30, 2014	208,880,813	166,609,592	79.8%
June 30, 2015	130,455,026	135,940,337	104.2%
June 30, 2016	121,898,903	135,815,817	111.4%
<b>Hazardous Members</b>			
June 30, 2011	\$ 29,585,257	\$ 19,952,580	67.4%
June 30, 2012	28,326,206	24,538,087	86.6%
June 30, 2013	26,252,911	25,682,403	97.8%
June 30, 2014	15,627,018	23,873,967	152.8%
June 30, 2015	13,151,938	14,882,343	113.2%
June 30, 2016	9,185,866	16,765,530	182.5%
<b>Total KERS Members</b>			
June 30, 2011	\$ 324,483,070	\$ 149,288,132	46.0%
June 30, 2012	326,230,430	180,595,303	55.4%
June 30, 2013	312,396,045	191,012,960	61.1%
June 30, 2014	224,507,831	190,483,559	84.8%
June 30, 2015	143,606,964	150,822,680	105.0%
June 30, 2016	131,084,769	152,581,347	116.4%



The information presented in the required supplementary schedules was determined as part of the actuarial valuation at June 30, 2016. Additional information as of the latest actuarial valuation follows.

	<b>Non-Hazardous Members</b>	<b>Hazardous Members</b>
Valuation date	6/30/2016	6/30/2016
Actuarial cost method	Entry Age	Entry Age
Amortization	Level Percent Closed	Level Percent Closed
Remaining amortization period	27 years	27 years
Asset valuation method	5 Year Smoothed Market	5 Year Smoothed Market
Medical Trend Assumption (Pre-Medicare)	7.50% - 5.00%	7.50% - 5.00%
Medical Trend Assumption (Post-Medicare)	5.50% - 5.00%	5.50% - 5.00%
Year Ultimate Trend	2021	2021
Dollar Contribution Trend	1.50%	1.50%
Actuarial assumptions:		
Investment rate of return*	7.50%	7.50%
*Includes price inflation at	3.25%	3.25%



## SCHEDULE A

### Valuation Balance Sheet and Solvency Test

The following valuation balance sheets show the assets and liabilities of the retirement system as of the current valuation date of June 30, 2016 and, for comparison purposes, as of the immediately preceding valuation date of June 30, 2015. The items shown in the balance sheet are present values actuarially determined as of the relevant valuation date.

#### VALUATION BALANCE SHEETS SHOWING THE ASSETS AND LIABILITIES OF THE KENTUCKY EMPLOYEES RETIREMENT SYSTEM

#### RETIREMENT BENEFITS NON-HAZARDOUS KERS MEMBERS

	June 30, 2016	June 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 2,112,286,498	\$ 2,350,989,940
Prospective contributions		
Member contributions	\$ 695,862,103	\$ 672,048,227
Employer normal contributions	556,170,049	366,345,728
Unfunded accrued liability contributions	<u>11,112,411,929</u>	<u>10,008,682,909</u>
Total prospective contributions	<u>\$ 12,364,444,081</u>	<u>\$ 11,047,076,864</u>
Total assets	<u>\$ 14,476,730,579</u>	<u>\$ 13,398,066,804</u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 9,600,527,994	\$ 9,088,328,416
Present value of benefits payable on account of active members	4,466,562,333	3,960,599,033
Present value of benefits payable on account of inactive members	<u>409,640,252</u>	<u>349,139,355</u>
Total liabilities	<u>\$ 14,476,730,579</u>	<u>\$ 13,398,066,804</u>



**VALUATION BALANCE SHEET  
RETIREMENT BENEFITS  
HAZARDOUS KERS MEMBERS**

	June 30, 2016	June 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 559,487,184	\$ 556,687,757
Prospective contributions		
Member contributions	\$ 107,586,642	\$ 91,736,829
Employer normal contributions	71,148,292	67,075,729
Unfunded accrued liability contributions	<u>377,218,942</u>	<u>338,745,630</u>
Total prospective contributions	<u>\$ 555,953,876</u>	<u>\$ 497,558,188</u>
 Total assets	 <u>\$ 1,115,441,060</u>	 <u>\$ 1,054,245,945</u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 618,592,164	\$ 605,818,504
 Present value of benefits payable on account of active members	 466,958,963	 421,056,647
 Present value of benefits payable on account of inactive members	 <u>29,889,933</u>	 <u>27,370,794</u>
 Total liabilities	 <u>\$ 1,115,441,060</u>	 <u>\$ 1,054,245,945</u>



**VALUATION BALANCE SHEET  
RETIREMENT BENEFITS  
TOTAL KERS MEMBERS**

	June 30, 2016	June 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 2,671,773,682	\$ 2,907,677,697
Prospective contributions		
Member contributions	\$ 803,448,745	\$ 763,785,056
Employer normal contributions	627,318,341	433,421,457
Unfunded accrued liability contributions	<u>11,489,630,871</u>	<u>10,347,428,539</u>
Total prospective contributions	<u>\$ 12,920,397,957</u>	<u>\$ 11,544,635,052</u>
 Total assets	 <u>\$ 15,592,171,639</u>	 <u>\$ 14,452,312,749</u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 10,219,120,158	\$ 9,694,146,920
 Present value of benefits payable on account of active members	 4,933,521,296	 4,381,655,680
 Present value of benefits payable on account of inactive members	 <u>439,530,185</u>	 <u>376,510,149</u>
 Total liabilities	 <u>\$ 15,592,171,639</u>	 <u>\$ 14,452,312,749</u>



**VALUATION BALANCE SHEET  
INSURANCE BENEFITS  
NON-HAZARDOUS KERS MEMBERS**

	June 30, 2016	June 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 743,270,060	\$ 695,018,262
Prospective contributions		
Member contributions	\$ 48,293,415	\$ 34,833,822
Employer normal contributions	243,914,729	277,045,451
Unfunded accrued liability contributions	<u>1,713,407,904</u>	<u>1,718,686,990</u>
Total prospective contributions	<u>\$ 2,005,616,048</u>	<u>\$ 2,030,566,263</u>
 Total assets	 <u>\$ 2,748,886,108</u>	 <u>\$ 2,725,584,525</u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 1,352,227,044	\$ 1,302,716,841
 Present value of benefits payable on account of active members	 1,265,250,497	 1,297,234,668
 Present value of benefits payable on account of inactive members	 <u>131,408,567</u>	 <u>125,633,016</u>
 Total liabilities	 <u>\$ 2,748,886,108</u>	 <u>\$ 2,725,584,525</u>



**VALUATION BALANCE SHEET  
INSURANCE BENEFITS  
HAZARDOUS KERS MEMBERS**

	June 30, 2016	June 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 473,160,173	\$ 451,514,191
Prospective contributions		
Member contributions	\$ 7,275,958	\$ 4,104,933
Employer normal contributions	47,365,033	53,171,611
Unfunded accrued liability contributions	<u>(95,414,943)</u>	<u>(76,609,957)</u>
Total prospective contributions	<u>\$ (40,773,952)</u>	<u>\$ (19,333,413)</u>
Total assets	<u>\$ 432,386,221</u>	<u>\$ 432,180,778</u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 217,752,911	\$ 210,989,670
Present value of benefits payable on account of active members	204,024,910	211,065,783
Present value of benefits payable on account of inactive members	<u>10,608,400</u>	<u>10,125,325</u>
Total liabilities	<u>\$ 432,386,221</u>	<u>\$ 432,180,778</u>



**VALUATION BALANCE SHEET  
INSURANCE BENEFITS  
TOTAL KERS MEMBERS**

	June 30, 2016	June 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 1,216,430,233	\$ 1,146,532,453
Prospective contributions		
Member contributions	\$ 55,569,373	\$ 38,938,755
Employer normal contributions	291,279,762	330,217,062
Unfunded accrued liability contributions	<u>1,617,992,961</u>	<u>1,642,077,033</u>
Total prospective contributions	<u>\$ 1,964,842,096</u>	<u>\$ 2,011,232,850</u>
 Total assets	 <u>\$ 3,181,272,329</u>	 <u>\$ 3,157,765,303</u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 1,569,979,955	\$ 1,513,706,511
 Present value of benefits payable on account of active members	 1,469,275,407	 1,508,300,451
 Present value of benefits payable on account of inactive members	 <u>142,016,967</u>	 <u>135,758,341</u>
 Total liabilities	 <u>\$ 3,181,272,329</u>	 <u>\$ 3,157,765,303</u>



The following tables provide the solvency test for non-hazardous and hazardous KERS members.

**Solvency Test  
Retirement Benefits  
Non-Hazardous KERS Members**

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Reported Asset		
	(1)	(2)	(3)	Actuarial Value of Assets	(1)	(2)	(3)
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed Portion)				
6/30/2011	\$ 916,568,932	\$ 8,482,714,356	\$ 1,782,858,744	\$ 3,726,986,087	100.0%	33.1%	0.0%
6/30/2012	885,137,183	8,708,536,338	1,767,374,615	3,101,316,738	100.0	25.4	0.0
6/30/2013	922,928,027	8,709,323,622	1,754,350,510	2,636,122,852	100.0	19.7	0.0
6/30/2014	928,557,540	8,870,692,596	1,750,860,088	2,423,956,716	100.0	16.9	0.0
6/30/2015	925,933,970	9,437,467,771	1,996,271,108	2,350,989,940	100.0	15.1	0.0
6/30/2016	920,120,230	10,010,168,246	2,294,409,951	2,112,286,498	100.0	11.9	0.0

**Solvency Test  
Retirement Benefits  
Hazardous KERS Members**

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Reported Asset		
	(1)	(2)	(3)	Actuarial Value of Assets	(1)	(2)	(3)
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed Portion)				
6/30/2011	\$ 86,614,205	\$ 490,395,078	\$ 144,284,161	\$ 510,748,505	100.0%	86.5%	0.0%
6/30/2012	82,100,877	521,688,803	148,909,777	497,226,296	100.0	79.6	0.0
6/30/2013	82,145,602	545,596,534	156,238,458	505,656,808	100.0	77.6	0.0
6/30/2014	83,663,535	581,231,300	151,955,228	527,897,261	100.0	76.4	0.0
6/30/2015	83,606,204	633,189,298	178,637,885	556,687,757	100.0	74.7	0.0
6/30/2016	86,705,297	648,482,097	201,518,732	559,487,184	100.0	72.9	0.0



**Solvency Test  
Insurance Benefits  
Non-Hazardous KERS Members**

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Reported Asset		
	(1)	(2)	(3)	Actuarial Value of Assets	(1)	(2)	(3)
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed Portion)				
6/30/2011	\$ 0	\$ 2,568,002,978	\$ 1,712,086,655	\$ 451,620,442	100.0%	17.6%	0.0%
6/30/2012	0	1,924,068,623	1,201,261,534	446,080,511	100.0	23.2	0.0
6/30/2013	0	1,338,772,860	789,981,274	497,584,327	100.0	37.2	0.0
6/30/2014	0	1,425,604,569	801,155,356	621,236,646	100.0	43.6	0.0
6/30/2015	0	1,428,349,857	985,355,395	695,018,262	100.0	48.7	0.0
6/30/2016	0	1,483,635,611	973,042,353	743,270,060	100.0	50.1	0.0

**Solvency Test  
Insurance Benefits  
Hazardous KERS Members**

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Reported Asset		
	(1)	(2)	(3)	Actuarial Value of Assets	(1)	(2)	(3)
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed Portion)				
6/30/2011	\$ 0	\$ 285,539,861	\$ 221,518,906	\$ 329,961,615	100.0%	100.0%	20.1%
6/30/2012	0	196,578,935	188,013,471	345,573,948	100.0	100.0	79.2
6/30/2013	0	202,031,515	183,486,160	370,774,403	100.0	100.0	92.0
6/30/2014	0	206,477,405	190,509,415	419,395,867	100.0	100.0	100.0
6/30/2015	0	221,114,995	153,789,239	451,514,191	100.0	100.0	100.0
6/30/2016	0	228,361,311	149,383,919	473,160,173	100.0	100.0	100.0



**SCHEDULE B**

**Development of Actuarial Value of Assets  
Retirement Benefits  
Non-Hazardous Members**

Valuation date June 30:	2015	2016	2017	2018	2019	2020
A. Actuarial Value Beginning of Year	\$ 2,423,956,716	\$ 2,350,989,940				
B. Market Value End of Year	2,307,858,072	1,953,422,354				
C. Market Value Beginning of Year	2,560,419,519	2,307,858,072				
D. Cash Flow						
D1. Contributions	632,777,097	614,761,373				
D2. Benefit Payments	(919,342,856)	(935,418,515)				
D3. Administrative Expenses	(10,473,878)	(10,988,559)				
D4. Investment Expenses	<u>(16,315,268)</u>	<u>(16,269,756)</u>				
D5. Net	(313,354,905)	(347,915,457)				
E. Investment Income						
E1. Market Total: B.-C.-D5.	60,793,458	(6,520,261)				
E2. Assumed Rate	7.75%	7.50%				
E3. Amount for Immediate Recognition	203,237,495	176,922,398				
E4. Amount for Phased-In Recognition	(142,444,037)	(183,442,659)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20*E4.	(28,488,807)	(36,688,532)	0	0	0	0
F2. First Prior Year	29,067,645	(28,488,807)	(36,688,532)	0	0	0
F3. Second Prior Year	15,221,118	29,067,645	(28,488,807)	(36,688,532)	0	0
F4. Third Prior Year	(46,821,807)	15,221,118	29,067,645	(28,488,807)	(36,688,532)	0
F5. Fourth Prior Year	<u>68,172,485</u>	<u>(46,821,807)</u>	<u>15,221,118</u>	<u>29,067,645</u>	<u>(28,488,807)</u>	<u>(36,688,532)</u>
F6. Total Recognized Investment Gain	37,150,634	(67,710,383)	(20,888,576)	(36,109,694)	(65,177,339)	(36,688,532)
G. Actuarial Value End of Year:						
A.+D5.+E3.+F6.	\$ 2,350,989,940	\$ 2,112,286,498				
H. Difference Between Market & Actuarial Values	\$ (43,131,868)	\$ (158,864,144)	\$ (137,975,568)	\$ (101,865,874)	\$ (36,688,532)	\$ 0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.



**Development of Actuarial Value of Assets  
Retirement Benefits  
Hazardous Members**

Valuation date June 30:	2015	2016	2017	2018	2019	2020
A. Actuarial Value Beginning of Year	\$ 527,897,261	\$ 556,687,757				
B. Market Value End of Year	550,120,310	524,678,968				
C. Market Value Beginning of Year	559,504,340	550,120,310				
D. Cash Flow						
D1. Contributions	42,153,137	38,814,280				
D2. Benefit Payments	(59,382,637)	(61,517,531)				
D3. Administrative Expenses	(844,208)	(916,265)				
D4. Investment Expenses	<u>(4,013,205)</u>	<u>(4,413,171)</u>				
D5. Net	(22,086,913)	(28,032,687)				
E. Investment Income						
E1. Market Total: B.-C.-D5.	12,702,883	2,591,345				
E2. Assumed Rate	7.75%	7.50%				
E3. Amount for Immediate Recognition	46,674,435	44,786,462				
E4. Amount for Phased-In Recognition	(33,971,552)	(42,195,117)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20*E4.	(6,794,310)	(8,439,023)	0	0	0	0
F2. First Prior Year	8,457,269	(6,794,310)	(8,439,023)	0	0	0
F3. Second Prior Year	2,416,270	8,457,269	(6,794,310)	(8,439,023)	0	0
F4. Third Prior Year	(9,594,554)	2,416,270	8,457,269	(6,794,310)	(8,439,023)	0
F5. Fourth Prior Year	<u>9,718,299</u>	<u>(9,594,554)</u>	<u>2,416,270</u>	<u>8,457,269</u>	<u>(6,794,310)</u>	<u>(8,439,023)</u>
F6. Total Recognized Investment Gain	4,202,974	(13,954,348)	(4,359,794)	(6,776,064)	(15,233,333)	(8,439,023)
G. Actuarial Value End of Year:						
A.+D5.+E3.+F6.	\$ 556,687,757	\$ 559,487,184				
H. Difference Between Market & Actuarial Values	\$ (6,567,447)	\$ (34,808,216)	\$ (30,448,422)	\$ (23,672,358)	\$ (8,439,023)	\$ 0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.



**Development of Actuarial Value of Assets  
Insurance Benefits  
Non-Hazardous Members**

Valuation date June 30:	2015	2016	2017	2018	2019	2020
A. Actuarial Value Beginning of Year	\$ 621,236,646	\$ 695,018,262				
B. Market Value End of Year	687,684,080	695,188,649				
C. Market Value Beginning of Year	664,775,708	687,684,080				
D. Cash Flow						
D1. Contributions	140,393,102	140,872,512				
D2. Benefit Payments	(125,273,008)	(128,644,977)				
D3. Administrative Expenses	(896,134)	(825,847)				
D4. Investment Expenses	<u>(3,654,438)</u>	<u>(3,527,784)</u>				
D5. Net	10,569,522	7,873,904				
E. Investment Income						
E1. Market Total: B.-C.-D5.	12,338,850	(369,335)				
E2. Assumed Rate	7.75%	7.50%				
E3. Amount for Immediate Recognition	55,725,734	55,531,653				
E4. Amount for Phased-In Recognition	(43,386,884)	(55,900,988)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20*E4.	(8,677,377)	(11,180,198)	0	0	0	0
F2. First Prior Year	10,997,800	(8,677,377)	(11,180,198)	0	0	0
F3. Second Prior Year	675,909	10,997,800	(8,677,377)	(11,180,198)	0	0
F4. Third Prior Year	(6,969,893)	675,909	10,997,800	(8,677,377)	(11,180,198)	0
F5. Fourth Prior Year	<u>11,459,921</u>	<u>(6,969,893)</u>	<u>675,909</u>	<u>10,997,800</u>	<u>(8,677,377)</u>	<u>(11,180,198)</u>
F6. Total Recognized Investment Gain	7,486,360	(15,153,759)	(8,183,866)	(8,859,775)	(19,857,575)	(11,180,198)
G. Actuarial Value End of Year:						
A.+D5.+E3.+F6.	\$ 695,018,262	\$ 743,270,060				
H. Difference Between Market & Actuarial Values	\$ (7,334,182)	\$ (48,081,411)	\$ (39,897,545)	\$ (31,037,770)	\$ (11,180,198)	\$ 0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.



**Development of Actuarial Value of Asset  
Insurance Benefits  
Hazardous Members**

Valuation date June 30:	2015	2016	2017	2018	2019	2020
A. Actuarial Value Beginning of Year	\$ 419,395,867	\$ 451,514,191				
B. Market Value End of Year	441,626,285	440,596,305				
C. Market Value Beginning of Year	435,503,976	441,626,285				
D. Cash Flow						
D1. Contributions	15,433,627	17,436,744				
D2. Benefit Payments	(17,000,969)	(17,489,919)				
D3. Administrative Expenses	(100,809)	(97,876)				
D4. Investment Expenses	<u>(2,765,329)</u>	<u>(3,290,159)</u>				
D5. Net	(4,433,480)	(3,441,210)				
E. Investment Income						
E1. Market Total: B.-C.-D5.	10,555,789	2,411,230				
E2. Assumed Rate	7.75%	7.50%				
E3. Amount for Immediate Recognition	36,452,246	36,406,466				
E4. Amount for Phased-In Recognition	(25,896,457)	(33,995,236)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20*E4.	(5,179,291)	(6,799,047)	0	0	0	0
F2. First Prior Year	4,571,403	(5,179,291)	(6,799,047)	0	0	0
F3. Second Prior Year	1,027,388	4,571,403	(5,179,291)	(6,799,047)	0	0
F4. Third Prior Year	(4,939,727)	1,027,388	4,571,403	(5,179,291)	(6,799,047)	0
F5. Fourth Prior Year	<u>4,619,785</u>	<u>(4,939,727)</u>	<u>1,027,388</u>	<u>4,571,403</u>	<u>(5,179,291)</u>	<u>(6,799,047)</u>
F6. Total Recognized Investment Gain	99,558	(11,319,274)	(6,379,547)	(7,406,935)	(11,978,338)	(6,799,047)
G. Actuarial Value End of Year:						
A.+D5.+E3.+F6.	\$ 451,514,191	\$ 473,160,173				
H. Difference Between Market & Actuarial Values	\$ (9,887,906)	\$ (32,563,868)	\$ (26,184,321)	\$ (18,777,386)	\$ (6,799,047)	\$ 0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.



**SCHEDULE C**

**STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS**

The assumptions and methods used in the valuation were based on the actuarial experience study for the five-year period ending June 30, 2013, submitted April 30, 2014, and adopted by the Board on December 4, 2014.

INVESTMENT RATE OF RETURN: 6.75% per annum for Non-Hazardous Pension Plan; 7.50% per annum for Hazardous Plans and the Non-Hazardous Insurance Plan, compounded annually for retirement and insurance benefits.

PRICE INFLATION: 3.25% per annum, compounded annually.

PAYROLL GROWTH: 4.00% per annum, compounded annually.

SALARY INCREASES: The assumed annual rates of future salary increases for both non-hazardous and hazardous members are as follows and include inflation at 4.00% per annum:

Service Years	Annual Rates of Salary Increases				
	Merit & Seniority		Base (Economy)	Increase Next Year	
	Non-Hazardous	Hazardous		Non-Hazardous	Hazardous
0-1	12.02%	15.87%	4.00%	16.50%	20.50%
1-2	4.33%	4.33%	4.00%	8.50%	8.50%
2-3	1.92%	2.40%	4.00%	6.00%	6.50%
3-4	1.44%	1.92%	4.00%	5.50%	6.00%
4-5	1.44%	1.44%	4.00%	5.50%	5.50%
5-6	1.44%	0.96%	4.00%	5.50%	5.00%
6-7	0.96%	0.48%	4.00%	5.00%	4.50%
7-8	0.96%	0.48%	4.00%	5.00%	4.50%
8-9	0.96%	0.48%	4.00%	5.00%	4.50%
9-10	0.48%	0.48%	4.00%	4.50%	4.50%
10 & Over	0.48%	0.48%	4.00%	4.50%	4.50%

DISABILITY: Representative assumed annual rates of disability for both non-hazardous and hazardous members are as follows:

Nearest Age	Annual Rates of Disability			
	Non-Hazardous		Hazardous	
	Male	Female	Male	Female
20	0.02%	0.02%	0.03%	0.03%
30	0.03%	0.03%	0.05%	0.05%
40	0.07%	0.07%	0.10%	0.10%
50	0.19%	0.19%	0.28%	0.28%
60	0.49%	0.49%	0.73%	0.73%



RETIREMENT: The assumed annual rates of retirement for both non-hazardous and hazardous members are as follows:

Annual Rates of Retirement					
Non-Hazardous			Hazardous		
Age	Those Eligible for Service Retirement*	Those Eligible for Service Retirement**	Service	Those Eligible for Service Retirement*	Those Eligible for Service Retirement**
55	8.0%		20	40.0%	
56	8.0%		21	40.0%	
57	8.0%		22	40.0%	
58	8.0%		23	40.0%	
59	8.0%		24	40.0%	
60	10.0%	10.0%	25	47.0%	40.0%
61	20.0%	20.0%	26	47.0%	40.0%
62	20.0%	20.0%	27	47.0%	40.0%
63	20.0%	20.0%	28	47.0%	40.0%
64	20.0%	20.0%	29	47.0%	40.0%
65	20.0%	25.0%	30	47.0%	47.0%
66	20.0%	25.0%	31	47.0%	47.0%
67	20.0%	25.0%	32	50.0%	47.0%
68	20.0%	25.0%	33	50.0%	47.0%
69	20.0%	25.0%	34	50.0%	47.0%
70	20.0%	25.0%	35	60.0%	47.0%
71	20.0%	25.0%	36	60.0%	47.0%
72	20.0%	25.0%	37	60.0%	50.0%
73	20.0%	25.0%	38	60.0%	50.0%
74	20.0%	25.0%	39	60.0%	50.0%
75	100.0%	100.0%	40	60.0%	60.0%

\* For members participating before September 1, 2008. If service is at least 27 years, the rate is 35%.

\*\* For members participating on or after September 1, 2008. If age plus service is at least 87, the rate is 35%.

+ For members participating before September 1, 2008. The annual rate of service retirement is 100% at age 65.

++ For members participating on or after September 1, 2008. The annual rate of service retirement is 100% at age 60.



**WITHDRAWAL:** The assumed annual rates of withdrawal for both non-hazardous and hazardous members are as follows:

Service Years	Annual Rates of Withdrawal	
	Non-Hazardous	Hazardous
0-1	22.50%	25.00%
1-2	15.50%	10.50%
2-3	12.50%	7.50%
3-4	10.50%	6.50%
4-5	9.00%	5.50%
5-6	6.50%	4.50%
6-7	5.50%	3.00%
7-8	5.00%	3.00%
8-9	4.50%	3.00%
9-10	4.50%	2.50%
10-11	4.00%	2.50%
11-13	4.00%	2.00%
13-15	3.50%	2.00%
15 & Over	3.00%	2.00%

**DEATH BEFORE RETIREMENT:** The rates of mortality for the period before retirement are according to the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (multiplied by 50% for males and 30% for females).

**DEATH AFTER RETIREMENT:** The rates of mortality for the period after service retirement are according to the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (set back 1 year for females) for all healthy retired members and beneficiaries. The RP-2000 Combined Disabled Mortality Table projected with Scale BB to 2013 (set back 4 years for males) is used for the period after disability retirement. These assumptions are used to measure the probabilities of each benefit payment being made after retirement. These assumptions contain margin for mortality improvements.

**PERCENT MARRIED:** 100% of employees are assumed to be married, with the wife 3 years younger than the husband.

**DEPENDENT CHILDREN:** For hazardous members' duty-related death benefits, it is assumed that the member is survived by two dependent children each age 6.

**FORM OF PAYMENT:** Participants are assumed to elect a life-only form of payment.

**ASSET VALUATION METHOD:** Five-year market related actuarial value, as developed in Schedule B. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected actuarial value of assets, based on the ultimate assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected actuarial value.



**ACTUARIAL COST METHOD:** Costs were determined using the Entry Age Normal, Level Percentage of Pay Actuarial Cost Method. Under this method, a calculation is made for retirement benefits to determine the uniform and constant percentage rate of contribution which, if applied to the compensation of the average new member during the entire period of his or her anticipated covered service, would be required to meet the cost of benefits payable. Actuarial gains and losses are reflected in the unfunded actuarial accrued liability.

**MULTIPLE STATUS/MULTIPLE SYSTEM MEMBERS:** Some members may be represented under more than one retirement system and/or may have more than one status (e.g., active in one system, deferred vested in another and retired from a different system). For pension purposes, members that are active in one System but have service in another are assumed to retire from the System in which they are currently active. Any deferred pension benefits from another System are assumed to begin once the member terminates from their current active position. The insurance liabilities for multiple status/multiple system members are calculated assuming only one benefit is payable across all Systems and that benefit is payable from the combination of status and System which produces the highest economic value to the member.

**AFFORDABLE CARE ACT (ACA):** The impact of the Affordable Care Act (ACA) was addressed in this valuation. Review of the information currently available did not identify any specific provisions of the ACA that are anticipated to significantly impact results. While the impact of certain provisions such as the excise tax on high-value health insurance plans beginning in 2018 (if applicable), mandated benefits and participation changes due to the individual mandate should be recognized in the determination of liabilities, overall future plan costs and the resulting liabilities are driven by the assumed rate of health care inflation (i.e., trend). The trend assumption forecasts the anticipated increase to initial per capita costs, taking into account health care cost inflation, increases in benefit utilization, government-mandated benefits, and technological advances. Given the uncertainty regarding the ACA's implementation (e.g., the impact of excise tax on high-value health insurance plans, changes in participation resulting from the implementation of state-based health insurance exchanges), continued monitoring of the ACA's impact on the insurance liability will be required.

**HEALTH CARE BENEFITS VALUED:** Medical and drug benefits for retirees under age 65 and Medicare eligible.

**HEALTH CARE SPOUSE AGE DIFFERENCE:** Wives are assumed to be three years younger than husbands.

**HEALTH CARE COST TREND RATES:** Following is a chart detailing trend assumptions.

Year	Annual Rate of Increase		
	Under Age 65	Age 65 & Older	Dollar Contribution*
2016	7.50%	5.50%	1.50%
2017	6.75%	5.25%	1.50%
2018	6.25%	5.00%	1.50%
2019	5.75%	5.00%	1.50%
2020	5.25%	5.00%	1.50%
2021 & Beyond	5.00%	5.00%	1.50%

\* Applies to members participating on or after July 1, 2003



**HEALTH CARE AGE RELATED MORBIDITY:** For retirees ages 65 and older, per capita health care costs are adjusted to reflect expected health care cost changes related to age. The increase to the net incurred claims was assumed to be:

Participant Age	Annual Increase
65 – 69	3.00%
70 – 74	2.50%
75 – 79	2.00%
80 – 84	1.00%
85 – 89	0.50%
90 & Beyond	0.00%

Please note that for the retiree health care liabilities of those under age 65, the current premium charged by the Kentucky Employees' Health Plan (KEHP) is used as the base cost and is projected forward using the health care trend assumption. No implicit rate subsidy is calculated or recognized as the implicit rate subsidy is deemed the responsibility of the KEHP. Under Actuarial Standard of Practice No. 6 (ASOP No. 6), aging subsidies (or implicit rate subsidies) should be recognized, as the differences in health care utilization and cost due to age have been demonstrated and well quantified. The impact of aging on a valuation's results can be as significant as the use of mortality, trend, and discounting. It has been the long-standing position that the responsibility for compliance with GASB Statement No. 43, when it relates to KEHP implicit subsidies, rests with KEHP, not KRS, as KRS has no operational authority over KEHP. As such, KEHP implicit subsidies are excluded from the OPEB valuation process of the Retiree Medical Plan. As GASB 74 and 75 prohibit such a deviation from ASOP No. 6, additional consideration to the current treatment of KEHP implicit rate subsidies may be needed in the future. The estimated impact of KEHP implicit subsidies to the actuarial accrued liability is an increase of \$327,100,333 for KERS non-hazardous and \$45,961,457 for KERS hazardous.

**HEALTH CARE DEFERRED VESTED BENEFIT RECIPIENT INITIAL AGE OF BENEFIT RECEIPT FOR MEMBERS:** Health care benefits are assumed to begin at the following ages for deferred vested benefit recipients:

Deferred Vested Initial Age of Benefit Receipt		
Applies Only to Members with Non-Hazardous Service		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
55	55	60

Deferred Vested Initial Age of Benefit Receipt		
Applies Only to Members with Hazardous Service		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
50	50	50



HEALTH CARE ANTICIPATED PLAN PARTICIPATION: Representative values of the assumed annual rates of member participation and spouse coverage are as follows:

Plan Elections of Covered Members Age 65 and Older as of January 1, 2017		
Kentucky Retirement System Health Plan	Non-Hazardous	Hazardous
Medical Only	7.62%	4.08%
Essential	8.01%	4.64%
Premium	84.37%	91.28%

Retirement Participation Rates			
Service at Retirement	Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
Under 10	50.00%	100.00%	100.00%
10 – 14	75.00%	100.00%	100.00%
15 – 19	90.00%	100.00%	100.00%
20+	100.00%	100.00%	100.00%

Disability/Death Participation Rates	
Members Participating Before July 1, 2003	
Duty-Disability	Duty Death-In-Service
100.00%	100.00%

Deferred Vested Member Participation Rates		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
50.00%	100.00%	100.00%

Members Electing Spouse Coverage		
Applies Only to Members with Hazardous Service		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
50.00%	50.00%	50.00%



HEALTH CARE MONTHLY PLAN COSTS: Assumed per capita health care costs were based on past experience and trended based on the assumptions. Following are charts detailing retiree per capita assumptions for the year following the valuation date. The amounts include medical and drug costs. Members under 65 are assumed to elect the LivingWell PPO. For retirees ages 65 and older, the full costs shown are before averaging. The average costs are then normalized to age 65 and age adjusted in calculating liabilities. The dollar amount contribution level is the cost to the system per year of service for members participating on or after July 1, 2003.

<b>Under Age 65 (KEHP) Full Costs as of January 1, 2016</b>				
<b>Tier Elected</b>	<b>LivingWell CDHP</b>	<b>LivingWell PPO</b>	<b>Standard PPO</b>	<b>Standard CDHP</b>
Single	\$ 702.10	\$ 721.14	\$ 678.22	\$ 663.80
Parent Plus	967.18	1,023.04	964.58	930.94
Couple	1,302.74	1,564.20	1,477.72	1,431.76
Family	1,453.94	1,738.40	1,640.22	1,594.52
Family C-R	810.00	865.64	815.50	793.18

<b>Age 65 and Older Full Costs as of January 1, 2016</b>	
Kentucky Retirement System Health Plan - Medical Only	\$162.47
Kentucky Retirement System Health Plan - Essential	77.76
Kentucky Retirement System Health Plan - Premium	252.51

<b>Age 65 and Older Average Cost as of the Valuation Date Based on Actual Retiree Elections</b>	
<b>Non-Hazardous</b>	<b>Hazardous</b>
\$225.54	\$234.37

<b>Dollar Amount Contribution Level Per Year of Service as of July 1, 2015</b>	
<b>Applies to members participating on or after July 1, 2003</b>	
<b>Non-Hazardous</b>	<b>Hazardous</b>
\$12.99	\$19.48



## SCHEDULE D

### SUMMARY OF MAIN BENEFIT AND CONTRIBUTION PROVISIONS

This schedule summarizes the major retirement benefit provisions of KERS included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

**Plan Year:** July 1 through June 30

#### **Non-Hazardous Normal Retirement:**

*Members whose participation began before 8/1/2004*

<i>Age Requirement</i>	65
<i>Service Requirement</i>	At least one month of non-hazardous duty service credit
<i>Amount</i>	<p>If a member has at least 48 months of service, the monthly benefit is 1.97% times final average compensation times years of service. For members who were participants in any one of the state retirement systems from January 1, 1998 through January 1, 1999, the benefit factor is 2.00%. For those members who retired between January 1, 1999 and January 31, 2009 with at least 240 months of service, the benefit factor is 2.20%.</p> <p>Final compensation is calculated by taking the average of the highest five (5) fiscal years of salary. If the number of months of service credit during the five (5) year period is less than forty-eight (48), one (1) or more additional fiscal years shall be used.</p> <p>If a member has less than 48 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.</p>

*Members whose participation began on or after 8/1/2004, but before 9/1/2008*

<i>Age Requirement</i>	65
<i>Service Requirement</i>	At least one month of non-hazardous duty service credit
<i>Amount</i>	<p>If a member has at least 48 months of service, the monthly benefit is 2.00% multiplied by final average compensation, multiplied by years of service.</p> <p>Final compensation is calculated by taking the average of the highest five (5) fiscal years of salary. If the number of months of service credit during the five (5) year period is less than forty-eight (48), one (1) or more additional fiscal years shall be used.</p> <p>If a member has less than 48 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.</p>



**Non-Hazardous Normal Retirement (continued):**

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

*Requirement* Age 65 with 60 months of non-hazardous duty service credit, or age 57 if age plus service equals at least 87.

*Amount* The monthly benefit is the following benefit factor based on service credit at retirement plus 2.00% for each year of service greater than 30 years, multiplied by final average compensation, multiplied by years of service.

Service Credit	Benefit Factor
10 years or less	1.10%
10+ – 20 years	1.30%
20+ – 26 years	1.50%
26+ – 30 years	1.75%

Final compensation is calculated by taking the average of the last (not highest) five (5) complete fiscal years of salary. Each fiscal year used to determine final compensation must contain twelve (12) months of service credit.

If a member has less than 60 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.

*Members whose participation began on or after 1/1/2014*

*Requirement* Age 65 with 60 months of non-hazardous duty service credit, or age 57 if age plus service equals at least 87.

*Amount* Each year that a member is an active contributing member to the System, the member and the member's employer will contribute 5.00% and 4.00% of creditable compensation respectively into a hypothetical account. This hypothetical account will earn interest annually on both the member's and employer's contribution at a minimum rate of 4%. If the System's geometric average net investment return for the previous five years exceeds 4%, then the hypothetical account will be credited with an additional amount of interest equal to 75% of the amount of the return which exceeds 4%. All interest credits will be applied to the hypothetical account balance on June 30 based on the account balance as of June 30 of the previous year.

Upon retirement the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or annuitized into a single life annuity option.



**Hazardous Normal Retirement:**

*Members whose participation began before 9/1/2008*

- Age Requirement* 55
- Service Requirement* At least one month of hazardous duty service credit
- Amount* If a member has at least 60 months of service, the monthly benefit is 2.49% multiplied by final average compensation, multiplied by years of service.  
  
Final compensation is calculated by taking the average of the highest three (3) fiscal years of salary. If the number of months of service credit during the three (3) year period is less than twenty-four (24), one (1) or more additional fiscal years shall be used.  
  
If a member has less than 60 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

- Age Requirement* 60
- Service Requirement* At least 60 months of hazardous duty service credit
- Amount* The monthly benefit is the following benefit factor based on service credit at retirement, multiplied by final average compensation, multiplied by years of service.

Service Credit	Benefit Factor
10 years or less	1.30%
10+ – 20 years	1.50%
20+ – 25 years	2.25%
25+ years	2.50%

Final compensation is calculated by taking the average of the highest three (3) complete fiscal years of salary. Each fiscal year used to determine final compensation must contain twelve (12) months of service credit.

If a member has less than 60 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.



**Hazardous Normal Retirement (continued):**

*Members whose participation began on or after 1/1/2014*

<i>Age Requirement</i>	60
<i>Service Requirement</i>	At least 60 months of hazardous duty service credit or 25 or more years of service, with no age requirement
<i>Amount</i>	<p>Each year that a member is an active contributing member to the System, the member and the member's employer will contribute 8.00% and 7.50% of creditable compensation respectively into a hypothetical account. This hypothetical account will earn interest annually on both the member's and employer's contribution at a minimum rate of 4%. If the System's geometric average net investment return for the previous five years exceeds 4%, then the hypothetical account will be credited with an additional amount of interest equal to 75% of the amount of the return which exceeds 4%. All interest credits will be applied to the hypothetical account balance on June 30 based on the account balance as of June 30 of the previous year.</p> <p>Upon retirement the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or annuitized into a single life annuity option.</p>

**Non-Hazardous Early Retirement:**

*Members whose participation began before 9/1/2008*

<i>Requirement</i>	Age 55 with 60 months of service or any age with 25 years of service.
<i>Amount</i>	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 65 or has less than 27 years of service, whichever is smaller.



**Non-Hazardous Early Retirement (continued):**

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

<i>Requirement</i>	Age 60 with 10 years of service.
<i>Amount</i>	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 65, or does not meet the rule of 87 (age plus service) and is younger than age 57, whichever is smaller.

**Hazardous Early Retirement:**

*Members whose participation began before 9/1/2008*

<i>Requirement</i>	Age 50 with 15 years of service or any age with 20 years of service.
<i>Amount</i>	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 55 or has less than 20 years of service, whichever is smaller.

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

<i>Requirement</i>	Age 50 with 15 years of service or any age with 25 years of service.
<i>Amount</i>	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 60 or has less than 25 years of service, whichever is smaller.

**Non-Hazardous Disability:**

<i>Age Requirement</i>	None
<i>Service Requirement</i>	60 months

*Members whose participation began before 8/1/2004*

Normal retirement benefit except that service credit will be added to total service for the period from the last day of plan employment to the member's 65th birthday or until the combined total service as of the last day of paid employment and added service equals 25 years. The total amount of service credit added shall not exceed the member's actual service credit on the last day of paid employment. For members with at least 25 years of service but less than 27 years of service, total service shall be 27 years. For employees with 27 or more years of service credit, actual service will be used.



**Non-Hazardous Disability (continued):**

A contributing member in a non-hazardous position who is disabled in the line of duty is entitled to a retirement benefit of not less than 25% of the member's final monthly rate of pay plus 10% of the member's final monthly rate of pay for each dependent child. The maximum dependent child's benefit is 40% of the member's final monthly rate of pay.

*Members whose participation began on or after 8/1/2004 but before 1/1/2014*

Normal retirement benefit based on actual service with no penalty or, if larger, 20% of the Final Rate of Pay. May apply for disability even after normal retirement age.

*Members whose participation began on or after 1/1/2014*

The hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or an annuity equal to the larger of 20% of the member's monthly final rate of pay or the annuitized hypothetical account into a single life annuity option.

**Hazardous Disability:**

*Age Requirement*

None

*Service Requirement*

60 months (waived if in line of duty disability)

*Members whose participation began before 8/1/2004*

Normal retirement benefit except if the member's total service credit is less than 20 years, service credit will be added for the period from the last day of paid employment to the member's 55th birthday.

The maximum service credit added will not exceed the total service the member had on this last day of paid employment and the maximum service credit for calculating his retirement allowance, including total service and service added will not exceed 20 years. May not apply if eligible for an unreduced retirement allowance.

A member in a hazardous position who is disabled in the line of duty is entitled to the normal retirement benefit based on years of service and final compensation determined as of the date of disability (no penalty), except that the monthly retirement allowance payable shall not be less than 25% of the member's monthly final monthly rate of pay. Each dependent child shall receive 10% of the disabled member's monthly final rate of pay; however the total maximum dependent children's benefit shall not exceed 40% of the member's monthly final rate of pay.



### Hazardous Disability (continued):

*Members whose participation began on or after 8/1/2004 but before 1/1/2014*

Normal retirement benefit based on years of service and final compensation determined as of the date of disability (no penalty) or, if larger, 25% of the member's monthly final rate of pay. May apply for disability even after normal retirement age.

*Members whose participation began on or after 1/1/2014*

The hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or an annuity equal to the larger of 25% of the member's monthly final rate of pay or the annuitized hypothetical account into a single life annuity option.

### Vesting:

*Members whose participation began before 9/1/2008*

*Age Requirement*

None

*Service Requirement*

60 months. Service purchased after August 1, 2004 does not count toward vesting insurance benefits. Service purchased by employees who began participating on or after August 1, 2004 does not count toward vesting retirement benefits. Recontribution of refunds and omitted service purchases are the exception to this rule for service requirement.

*Amount*

Normal retirement benefit deferred to normal retirement age or reduced benefit payable at early retirement age.

*Normal Retirement Age*

65 for non-hazardous members and 55 for hazardous members.

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

*Age Requirement*

None

*Service Requirement*

60 months. Service purchased after August 1, 2004 does not count toward vesting insurance benefits.

Service purchased by employees who began participating on or after August 1, 2004 does not count toward vesting retirement benefits. Recontribution of refunds and omitted service purchases are the exception to this rule for service requirement.

*Amount*

Normal retirement benefit deferred to normal retirement age or reduced benefit payable at early retirement age.



**Vesting (continued):**

*Normal Retirement Age* 65 for non-hazardous members and 60 for hazardous members.

*Members whose participation began on or after 1/1/2014*

*Age Requirement* None

*Service Requirement* 60 months.

*Amount* Upon termination the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or the member can elect to leave the hypothetical account balance in the System. If the member does not withdraw the account balance, it will continue to earn 4% interest. Upon reaching normal retirement age the member can apply for retirement and receive the account balance as a lump sum payment or annuitize the account balance into a single life annuity.

**Pre-Retirement Death Benefit (not in line of duty):**

*Members whose participation began before 1/1/2014*

*Requirement* Eligible for Normal or Early Retirement, or any age in active employment with 60 months service, or any age and not in active employment with at least 144 months of service.

*Amount* Benefit equal to the benefit the member would have received had the member retired on the day before the date of death and elected a 100% joint and survivor form. Benefit is actuarially reduced if member is less than normal retirement age at the date of death.

*Members whose participation began on or after 1/1/2014*

*Requirement* 60 months service

*Amount* The maximum of the benefit equal to the benefit the member would have received had the member retired on the day before the date of death.



**Spouse's Pre-Retirement Death Benefit (in line of duty):**

<i>Requirement</i>	None
<i>Amount</i>	The spouse may choose (1) a \$10,000 lump sum payment and monthly payments of 25% of the member's final monthly rate of pay or (2) benefit options offered under death not in line of duty.

**Dependent Non-Spouse's Death Benefit (in line of duty) – Hazardous Plan:**

<i>Requirement</i>	None
<i>Amount</i>	The non-spouse may choose (1) a \$10,000 lump sum payment or (2) benefit options offered under death not in line of duty.

**Dependent Child's Death Benefit (in line of duty):**

<i>Requirement</i>	None
<i>Amount</i>	10% of member's final monthly rate of pay. Dependent child payments cannot exceed 40% of the member's monthly final rate of pay.

**Post-Retirement Death Benefit:**

<i>Requirement</i>	Retired member in receipt of monthly benefit based on at least 48 months or more of combined service with KERS, CERS or SPRS.
<i>Amount</i>	\$5,000

**Non-Hazardous Member Contributions:**

<i>Members whose participation began before 9/1/2008</i>	5% of all creditable compensation. Interest paid on the members' accounts is currently 2.5% shall not be less than 2.0%. Member entitled to a full refund of contributions with interest.
<i>Members whose participation began on or after 9/1/2008</i>	6% of all creditable compensation, with 5% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Interest paid on the members' accounts will be set at 2.5%. Member entitled to a full refund of contributions and interest in their individual account, however, the 1% contributed to the insurance fund is non-refundable.



**Non-Hazardous Member Contributions (continued):**

*Members whose participation began on or after 1/1/2014*

6% of all creditable compensation, with 5% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Member entitled to a full refund of contributions and interest on the member's portion of the hypothetical account, however, the 1% contributed to the insurance fund is non-refundable.

**Hazardous Member Contributions:**

*Members whose participation began before 9/1/2008*

8% of all creditable compensation. Interest paid on the members' accounts is currently set at 2.5% and per statute, shall not be less than 2.0%. Member entitled to a full refund of contributions with interest.

*Members whose participation began on or after 9/1/2008 and up to 1/1/2014*

9% of all creditable compensation, with 8% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Interest paid on the members' accounts will be set at 2.5%. Member entitled to a full refund of contributions and interest in their individual account, however, the 1% contributed to the insurance fund is non-refundable.

*Members whose participation began on or after 1/1/2014*

9% of all creditable compensation, with 8% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Member entitled to a full refund of contributions and interest on the member's portion of the hypothetical account, however, the 1% contributed to the insurance fund is non-refundable.



**Non-Hazardous Insurance Plan for Retirees:**

*Members whose participation began before 7/1/2003*

*Requirement*

In receipt of a monthly retirement allowance.

*Amount*

The Retirement System pays a portion of lifetime medical premiums for retirees based on the retired member's years of service credit. The percentage of the monthly contribution rate paid is show in the following table.

Service Credit	Percentage Paid*
0 – 3 years	0%
4 – 9 years	25%
10 – 14 years	50%
15 – 19 years	75%
20 or more years	100%

*\*100% of the monthly contribution is paid towards the health insurance for a retired member who is totally disabled from any employment as a result of a duty-related injury regardless of actual service. 100% of the monthly contribution is paid toward health insurance for the spouse and dependent children of a member who dies as a result of a duty related injury, regardless of the deceased member's service. The insurance benefit will be provided as long as the spouse and dependent children are eligible for a monthly retirement benefit.*

*Members whose participation began on or after 7/1/2003, but before 9/1/2008*

*Requirement*

Monthly retirement allowance with at least 120 months of service at retirement.

*Amount*

The Retirement System pays \$12.99 per month for each year of earned service for retirees. This amount is shown as of the valuation date and is increased annually by 1.5%.

*Members whose participation began on or after 9/1/2008*

*Requirement*

Monthly retirement allowance with at least 180 months of service at retirement.

*Amount*

The Retirement System pays \$12.99 per month for each year of earned service for retirees. This amount will be increased annually by 1.5%.



**Hazardous Insurance Plan for Retirees:**

*Members whose participation began before 7/1/2003*

*Requirement*

In receipt of a monthly retirement allowance.

*Amount*

The Retirement System pays a portion of lifetime medical premiums for retirees, their spouse and their dependents based on the retired member's years of service credit. The percentage of the monthly contribution rate paid is show in the following table.

Service Credit	Percentage Paid*
0 – 3 years	0%
4 – 9 years	25%
10 – 14 years	50%
15 – 19 years	75%
20 or more years	100%

*\*100% of the monthly contribution is paid towards the health insurance for a member, member's spouse and dependents if the member is disabled in the line of duty as a result of a duty-related injury, regardless of actual service. 100% of the monthly contribution is paid toward health insurance for the spouse and dependent children of a member who dies in the line of duty regardless of the deceased member's service. The insurance benefit will be provided as long as the spouse and dependent children are eligible for a monthly retirement benefit.*

*Members whose participation began on or after 7/1/2003, but before 9/1/2008*

*Requirement*

Monthly retirement allowance with at least 120 months of service at retirement.

*Amount*

The Retirement System pays \$19.48 per month for each year of earned service for retirees. Upon the retiree's death, the surviving spouse will receive \$12.99 per month for each year of earned. These amounts are shown as of the valuation date and are increased annually by 1.5%.

*Members whose participation began on or after 9/1/2008*

*Requirement*

Monthly retirement allowance with at least 180 months of service at retirement.

*Amount*

The Retirement System pays \$19.48 per month for each year of earned service for retirees. Upon the retiree's death, the surviving spouse will receive \$12.99 per month for each year of earned. These amounts will be increased annually by 1.5%.



**SCHEDULE E**

**DETAILED TABULATIONS OF THE DATA**

**Schedule of Non-Hazardous Retired Members Added to and Removed From Rolls  
Last Six Fiscal Years**

<b>Year Ending June 30</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
			<b><u>Number</u></b>			
Beginning of Year	37,945	38,597	39,226	40,194	41,223	42,269
Added	1,592	1,707	1,982	2,067	2,140	2,441
Removed	940	1,078	1,014	1,038	1,094	706
End of Year	38,597	39,226	40,194	41,223	42,269	44,004
			<b><u>Annual Allowances*</u></b>			
Beginning of Year	\$ 801,881,911	\$ 821,197,278	\$ 844,880,945	\$ 872,139,782	\$ 866,046,656	\$ 883,577,572
Added	31,930,847	37,458,130	41,468,079	31,433,028	32,433,375	61,293,789
Removed	12,615,480	13,774,463	14,209,242	15,142,500	14,902,459	9,941,594
End of Year	\$ 821,197,278	\$ 844,880,945	\$ 872,139,782	\$ 866,046,656	\$ 883,577,572	\$ 934,929,767
% Increase in Allowances	(1.31)%	2.88%	3.23%	(0.70)%	2.02%	5.81%
Average Annual Allowance	\$ 21,276	\$ 21,539	\$ 21,698	\$ 21,009	\$ 20,904	\$ 21,246

\* The annual allowances shown for 2013 and later include allowances for hazardous members who are receiving a portion of benefit from the non-hazardous system.



**Schedule of Hazardous Retired Members Added to and Removed From Rolls  
Last Six Fiscal Years**

Year Ending June 30	2011	2012	2013	2014	2015	2016
	<b><u>Number</u></b>					
Beginning of Year	2,835	3,064	3,253	3,430	3,620	3,758
Added	288	243	229	256	203	237
Removed	59	54	52	66	65	29
End of Year	3,064	3,253	3,430	3,620	3,758	3,966
	<b><u>Annual Allowances</u></b>					
Beginning of Year	\$ 41,114,800	\$ 45,609,229	\$ 49,231,205	\$ 51,122,456	\$ 54,271,718	\$ 56,431,099
Added	5,012,933	4,213,360	2,390,928	3,761,697	3,144,016	3,028,060
Removed	518,504	591,384	499,677	612,435	984,635	458,210
End of Year	\$ 45,609,229	\$ 49,231,205	\$ 51,122,456	\$ 54,271,718	\$ 56,431,099	\$ 59,000,949
% Increase in Allowances	6.25%	7.94%	3.84%	6.16%	3.98%	4.55%
Average Annual Allowance	\$ 14,886	\$ 15,134	\$ 14,905	\$ 14,992	\$ 15,016	\$ 14,877



**Non-Hazardous Retired Lives Summary June 30, 2016**

	Male Lives		Female Lives		Total	
	Number	Monthly Benefits	Number	Monthly Benefits	Number	Monthly Benefits
Basic Form	3,876	\$ 6,980,204.66	11,283	\$ 16,585,997.69	15,159	\$ 23,566,202.35
Straight Life (Old Plan)	0	0.00	0	0.00	0	0.00
Joint & Survivor						
100% to Beneficiary	2,149	3,985,991.96	976	1,212,989.19	3,125	5,198,981.15
66-2/3% to Beneficiary	803	2,286,315.75	497	1,010,205.80	1,300	3,296,521.55
50% to Beneficiary	1,137	2,874,494.33	1,413	2,835,242.12	2,550	5,709,736.45
Pop-up Option	3,898	9,578,675.60	3,491	6,874,561.14	7,389	16,453,236.74
10 Years Certain	0	0.00	0	0.00	0	0.00
10 Years Certain & Life	953	1,667,803.05	2,159	3,263,781.61	3,112	4,931,584.66
Social Security Option						
Age 62 Basic	405	922,773.25	969	1,665,253.66	1,374	2,588,026.91
Age 62 Survivorship	813	1,751,830.13	598	1,015,260.04	1,411	2,767,090.17
Partial Deferred (Old Plan)	0	0.00	0	0.00	0	0.00
Widows Age 60	0	0.00	0	0.00	0	0.00
Dependent Child	0	0.00	0	0.00	0	0.00
Refund	0	0.00	0	0.00	0	0.00
15 Years Certain & Life	420	666,325.29	583	878,004.85	1,003	1,544,330.14
20 Years Certain & Life	408	892,023.43	589	925,683.80	997	1,817,707.23
5 Years Certain	0	0.00	0	0.00	0	0.00
PLSO 12 Month Basic	82	134,530.89	297	450,015.34	379	584,546.23
PLSO 24 Month Basic	33	40,037.69	158	201,267.29	191	241,304.98
PLSO 36 Month Basic	146	131,141.45	404	306,704.06	550	437,845.51
PLSO 12 Month Survivor	105	220,991.67	102	174,083.95	207	395,075.62
PLSO 24 Month Survivor	82	130,327.77	78	114,819.45	160	245,147.22
PLSO 36 Month Survivor	233	255,564.11	157	134,840.38	390	390,404.49
<b>Total</b>	<b>15,543</b>	<b>\$ 32,519,031.03</b>	<b>23,754</b>	<b>\$ 37,648,710.37</b>	<b>39,297</b>	<b>\$ 70,167,741.40</b>



**Hazardous Retired Lives Summary June 30, 2016**

	Male Lives		Female Lives		Total	
	Number	Monthly Benefits	Number	Monthly Benefits	Number	Monthly Benefits
Basic Form	581	\$ 658,370.14	453	\$ 481,849.78	1,034	\$ 1,140,219.92
Straight Life (Old Plan)	0	0.00	0	0.00	0	0.00
Joint & Survivor						
100% to Beneficiary	288	342,604.11	35	39,937.92	323	382,542.03
66-2/3% to Beneficiary	99	129,375.91	26	28,907.23	125	158,283.14
50% to Beneficiary	159	240,036.62	60	91,309.85	219	331,346.47
Pop-up Option	822	1,229,351.73	157	202,182.21	979	1,431,533.94
10 Years Certain	43	59,933.57	10	11,482.60	53	71,416.17
10 Years Certain & Life	111	130,668.04	71	62,982.49	182	193,650.53
Social Security Option						
Age 62 Basic	59	97,750.31	32	46,949.70	91	144,700.01
Age 62 Survivorship	142	262,072.48	18	23,884.69	160	285,957.17
Partial Deferred (Old Plan)	0	0.00	0	0.00	0	0.00
Widows Age 60	0	0.00	0	0.00	0	0.00
Dependent Child	0	0.00	0	0.00	0	0.00
Refund	0	0.00	0	0.00	0	0.00
15 Years Certain & Life	48	59,878.04	21	21,780.05	69	81,658.09
20 Years Certain & Life	55	74,771.62	28	37,675.36	83	112,446.98
5 Years Certain	0	0.00	0	0.00	0	0.00
PLSO 12 Month Basic	11	10,996.56	13	10,878.00	24	21,874.56
PLSO 24 Month Basic	15	15,174.89	9	7,947.86	24	23,122.75
PLSO 36 Month Basic	46	39,101.25	24	20,365.85	70	59,467.10
PLSO 12 Month Survivor	21	27,586.95	6	5,150.84	27	32,737.79
PLSO 24 Month Survivor	19	27,990.82	9	11,029.16	28	39,019.98
PLSO 36 Month Survivor	47	46,297.04	15	18,695.05	62	64,992.09
<b>Total</b>	<b>2,566</b>	<b>\$ 3,451,960.08</b>	<b>987</b>	<b>\$ 1,123,008.64</b>	<b>3,553</b>	<b>\$ 4,574,968.72</b>



**Non-Hazardous Beneficiary Lives Summary June 30, 2016**

	Male Lives		Female Lives		Total	
	Number	Monthly Benefits	Number	Monthly Benefits	Number	Monthly Benefits
Basic Form	13	\$ 6,944.38	29	\$ 33,054.05	42	\$ 39,998.43
Straight Life (Old Plan)	0	0.00	0	0.00	0	0.00
Joint & Survivor						
100% to Beneficiary	298	247,041.89	1,549	1,656,073.32	1,847	1,903,115.21
66-2/3% to Beneficiary	57	62,579.20	328	370,883.36	385	433,462.56
50% to Beneficiary	141	108,898.88	466	343,059.72	607	451,958.60
Pop-up Option	163	259,319.64	650	1,059,376.91	813	1,318,696.55
10 Years Certain	90	70,140.71	93	73,430.11	183	143,570.82
10 Years Certain & Life	26	27,255.93	36	36,960.52	62	64,216.45
Social Security Option						
Age 62 Basic	0	0.00	9	10,097.86	9	10,097.86
Age 62 Survivorship	61	89,210.53	304	556,919.61	365	646,130.14
Partial Deferred (Old Plan)	0	0.00	0	0.00	0	0.00
Widows Age 60	0	0	4	1,501	4	1,500.58
Dependent Child	0	0.00	0	0.00	0	0.00
Refund	3	2,136	7	8,134	10	10,269.82
15 Years Certain & Life	14	22,737.66	45	52,457.91	59	75,195.57
20 Years Certain & Life	22	34,016.06	63	116,635.71	85	150,651.77
5 Years Certain	41	47,810	52	42,310	93	90,120.46
PLSO 12 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 24 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 36 Month Basic	0	0.00	2	3,357.39	2	3,357.39
PLSO 12 Month Survivor	5	8,931.63	20	34,246.26	25	43,177.89
PLSO 24 Month Survivor	11	12,668.80	26	23,108.86	37	35,777.66
PLSO 36 Month Survivor	19	13,461.13	60	58,694.55	79	72,155.68
<b>Total</b>	<b>964</b>	<b>\$ 1,013,152.35</b>	<b>3,743</b>	<b>\$ 4,480,301.09</b>	<b>4,707</b>	<b>\$ 5,493,453.44</b>



**Hazardous Beneficiary Lives Summary June 30, 2016**

	Male Lives		Female Lives		Total	
	Number	Monthly Benefits	Number	Monthly Benefits	Number	Monthly Benefits
Basic Form	2	\$ 1,051.91	5	\$ 3,811.80	7	\$ 4,863.71
Straight Life (Old Plan)	0	0.00	0	0.00	0	0.00
Joint & Survivor						
100% to Beneficiary	11	4,167.29	138	103,469.47	149	107,636.76
66-2/3% to Beneficiary	0	0.00	19	8,922.41	19	8,922.41
50% to Beneficiary	2	1,450.30	30	12,427.90	32	13,878.20
Pop-up Option	14	13,388.26	87	79,236.54	101	92,624.80
10 Years Certain	3	3,404.88	17	14,246.89	20	17,651.77
10 Years Certain & Life	5	3,601.13	3	2,535.23	8	6,136.36
Social Security Option						
Age 62 Basic	0	0.00	0	0.00	0	0.00
Age 62 Survivorship	0	0.00	32	54,529.14	32	54,529.14
Partial Deferred (Old Plan)	0	0.00	0	0.00	0	0.00
Widows Age 60	0	0.00	0	0.00	0	0.00
Dependent Child	0	0.00	0	0.00	0	0.00
Refund	1	262.55	3	2,151.81	4	2,414.36
15 Years Certain & Life	2	818.50	6	4,251.38	8	5,069.88
20 Years Certain & Life	0	0.00	7	5,460.34	7	5,460.34
5 Years Certain	1	634.60	5	3,630.36	6	4,264.96
PLSO 12 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 24 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 36 Month Basic	0	0.00	1	125.74	1	125.74
PLSO 12 Month Survivor	0	0.00	4	4,145.13	4	4,145.13
PLSO 24 Month Survivor	1	995.41	3	2,021.84	4	3,017.25
PLSO 36 Month Survivor	2	706.28	9	10,329.90	11	11,036.18
<b>Total</b>	<b>44</b>	<b>\$ 30,481.11</b>	<b>369</b>	<b>\$ 311,295.88</b>	<b>413</b>	<b>\$ 341,776.99</b>



**Non-Hazardous Members  
Retired and Beneficiary Information June 30, 2016  
Tabulated by Attained Ages**

Attained Age	Retirement		Disability Retirement		Survivors and Beneficiaries		Total	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 45	23	\$ 406,343	27	\$ 334,095	90	\$ 620,140	140	\$ 1,360,578
45-49	422	\$ 10,265,371	93	\$ 1,330,582	41	\$ 509,397	556	\$ 12,105,350
50-54	1,515	\$ 41,662,835	166	\$ 2,496,519	111	\$ 1,504,991	1,792	\$ 45,664,345
55-59	3,939	\$ 108,743,650	278	\$ 3,826,193	212	\$ 2,927,441	4,429	\$ 115,497,284
60-64	6,885	\$ 173,541,468	399	\$ 5,538,887	369	\$ 5,989,984	7,653	\$ 185,070,339
65-69	9,286	\$ 206,945,611	391	\$ 4,949,122	540	\$ 9,746,771	10,217	\$ 221,641,504
70-74	6,409	\$ 131,285,882	255	\$ 2,989,782	581	\$ 10,337,108	7,245	\$ 144,612,772
75-79	4,006	\$ 72,935,328	213	\$ 2,572,823	548	\$ 8,404,568	4,767	\$ 83,912,719
80-84	2,461	\$ 38,744,229	100	\$ 1,080,329	606	\$ 9,244,675	3,167	\$ 49,069,233
85-89	1,531	\$ 22,209,412	35	\$ 356,010	553	\$ 7,936,188	2,119	\$ 30,501,610
90 & Over	850	\$ 9,726,143	13	\$ 72,283	1,056	\$ 8,700,178	1,919	\$ 18,498,604
Totals	37,327	\$ 816,466,272	1,970	\$ 25,546,625	4,707	\$ 65,921,441	44,004	\$ 907,934,338



**Hazardous Members  
Retired and Beneficiary Information June 30, 2016  
Tabulated by Attained Ages**

Attained Age	Retirement		Disability Retirement		Survivors and Beneficiaries		Total	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 45	26	\$ 516,908	13	\$ 164,359	18	\$ 107,172	57	\$ 788,439
45-49	173	\$ 3,469,160	9	\$ 102,321	9	\$ 120,958	191	\$ 3,692,439
50-54	312	\$ 6,111,813	27	\$ 255,154	12	\$ 155,039	351	\$ 6,522,006
55-59	502	\$ 9,657,380	24	\$ 225,793	30	\$ 370,852	556	\$ 10,254,025
60-64	663	\$ 10,945,216	26	\$ 247,088	50	\$ 641,844	739	\$ 11,834,148
65-69	886	\$ 13,169,032	31	\$ 231,898	65	\$ 759,793	982	\$ 14,160,723
70-74	478	\$ 6,137,557	9	\$ 55,486	68	\$ 583,512	555	\$ 6,776,555
75-79	213	\$ 2,293,996	5	\$ 15,703	57	\$ 603,844	275	\$ 2,913,543
80-84	105	\$ 816,828	5	\$ 25,318	53	\$ 355,144	163	\$ 1,197,290
85-89	38	\$ 302,600	0	\$ -	32	\$ 226,084	70	\$ 528,684
90 & Over	8	\$ 156,015	0	\$ -	19	\$ 177,082	27	\$ 333,097
Totals	3,404	\$ 53,576,505	149	\$ 1,323,120	413	\$ 4,101,324	3,966	\$ 59,000,949



**Total Non-Hazardous Active Members as of June 30, 2016  
Tabulated by Attained Ages and Years of Service**

Attained Age	Years of Service to Valuation Date								Totals
	0-4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 26	27 - 29	30+	
Under 20	19	1							20
Avg Pay	\$21,330	\$36,379							\$22,082
20-24	877	5							882
Avg Pay	\$25,050	\$23,692							\$25,042
25-29	2,664	369							3,033
Avg Pay	\$30,350	\$33,375							\$30,718
30-34	2,068	1,517	390	16					3,991
Avg Pay	\$32,672	\$37,814	\$39,401	\$41,104					\$35,318
35-39	1,570	1,422	1,382	562	24	1			4,961
Avg Pay	\$33,926	\$39,788	\$43,006	\$42,996	\$51,609	\$26,479			\$39,247
40-44	1,287	1,095	1,141	1,249	392	32	8	4	5,208
Avg Pay	\$32,849	\$39,123	\$44,444	\$46,802	\$50,221	\$58,584	\$61,727	\$92,997	\$41,611
44-49	1,202	991	980	1,147	891	266	130	39	5,646
Avg Pay	\$32,524	\$38,767	\$45,093	\$45,486	\$51,954	\$51,180	\$56,458	\$65,901	\$43,162
50-54	968	925	909	905	736	282	275	204	5,204
Avg Pay	\$33,828	\$38,080	\$43,113	\$46,038	\$50,973	\$54,161	\$55,748	\$60,763	\$44,070
55-59	665	822	900	879	565	215	190	186	4,422
Avg Pay	\$34,566	\$38,455	\$41,360	\$44,633	\$48,075	\$51,371	\$54,398	\$60,629	\$43,164
60-64	404	589	632	640	370	148	115	122	3,020
Avg Pay	\$39,517	\$39,990	\$41,077	\$44,523	\$47,539	\$52,227	\$52,933	\$64,415	\$44,119
65-69	122	225	251	213	103	38	36	42	1,030
Avg Pay	\$39,884	\$40,459	\$43,765	\$46,360	\$54,448	\$52,415	\$59,179	\$68,487	\$46,054
70 & over	34	65	90	85	34	17	20	17	362
Avg Pay	\$36,900	\$37,903	\$39,723	\$47,430	\$61,745	\$56,443	\$56,884	\$63,462	\$45,857
<b>Totals</b>	<b>11,880</b>	<b>8,026</b>	<b>6,675</b>	<b>5,696</b>	<b>3,115</b>	<b>999</b>	<b>774</b>	<b>614</b>	<b>37,779</b>
<b>Avg Pay</b>	<b>\$32,260</b>	<b>\$38,578</b>	<b>\$42,942</b>	<b>\$45,426</b>	<b>\$50,463</b>	<b>\$52,567</b>	<b>\$55,368</b>	<b>\$62,588</b>	<b>\$40,479</b>



**Total Hazardous Active Members as of June 30, 2016  
Tabulated by Attained Ages and Years of Service**

Attained Age	Years of Service to Valuation Date								Totals
	0-4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 26	27 - 29	30+	
Under 20 Avg Pay									
20-24 Avg Pay	263 \$26,636								263 \$26,636
25-29 Avg Pay	553 \$31,712	51 \$37,132							604 \$32,169
30-34 Avg Pay	335 \$31,607	204 \$38,290	50 \$42,339						589 \$34,833
35-39 Avg Pay	165 \$34,111	135 \$37,920	168 \$41,309	37 \$42,622					505 \$38,147
40-44 Avg Pay	144 \$30,590	127 \$40,194	122 \$44,987	140 \$46,337	22 \$51,184				555 \$40,741
44-49 Avg Pay	140 \$33,213	91 \$37,083	127 \$43,562	102 \$46,641	45 \$50,744	6 \$63,665	3 \$53,860		514 \$41,131
50-54 Avg Pay	126 \$32,465	85 \$37,606	76 \$41,798	73 \$45,271	23 \$49,710	9 \$62,228	9 \$51,034	1 \$68,468	402 \$39,800
55-59 Avg Pay	75 \$33,140	52 \$37,952	61 \$40,074	64 \$46,391	11 \$51,476	2 \$74,484	3 \$57,289	2 \$82,027	270 \$40,458
60-64 Avg Pay	42 \$34,824	52 \$40,271	46 \$41,673	39 \$42,363	10 \$47,522	3 \$48,332	1 \$37,790	1 \$33,529	194 \$40,296
65-69 Avg Pay	5 \$32,611	15 \$43,235	19 \$40,186	8 \$53,383	3 \$66,068		1 \$81,646	2 \$58,395	53 \$45,261
70 & over Avg Pay	1 \$29,614	2 \$36,223	2 \$48,917	4 \$54,093		1 \$38,788			10 \$45,506
<b>Totals Avg Pay</b>	<b>1,849 \$31,392</b>	<b>814 \$38,438</b>	<b>671 \$42,440</b>	<b>467 \$45,805</b>	<b>114 \$50,812</b>	<b>21 \$60,705</b>	<b>17 \$53,658</b>	<b>6 \$63,807</b>	<b>3,959 \$37,273</b>



## SCHEDULE F

### **SENSITIVITY ANALYSIS**

The valuation results are projections based on the actuarial assumptions. Actual experience will differ from these assumptions, either increasing or decreasing cost. The charts on the following pages provide a simple analysis on how the costs are sensitive to changes to the assumed discount rate, the assumed inflation rate and the rate of payroll growth. The charts show the actuarial accrued liability, the unfunded liability, the funded ratio and the employer contribution rate under the following scenarios:

- The discount rate assumption sensitivity analysis shows the valuation results with the baseline discount rate assumption, 6.75% (Retirement Non-Hazardous) and 7.50% (Retirement Hazardous and Insurance), together with a decrease in the discount rate to 5.75% (Retirement Non-Hazardous) and 6.50% (Retirement Hazardous and Insurance) and an increase in the discount rate to 7.75% (Retirement Non-Hazardous) and 8.50% (Retirement Hazardous and Insurance). Under this scenario, the underlying inflation rate assumption is held constant at 3.25% and the payroll growth assumption is held constant at 4.00%.
- The inflation assumption sensitivity analysis shows the valuation results with the baseline underlying inflation rate assumption, 3.25%, together with decreases in the inflation rate to 3.00% and 2.75%. Under this scenario, the decrease in the underlying inflation rate assumption leads to corresponding decreases in the discount rate, the payroll growth assumption and the healthcare trend assumption for members hired before 7/1/2003.
- The payroll growth assumption sensitivity analysis shows the valuation results with the baseline underlying payroll growth assumption, 4.00%, together with decreases in the payroll growth assumption to 2.00% and 0.00%. Under this scenario, all other assumptions, including the individual member salary scale, are held constant so that the only impact is in the amortization of the unfunded liability, leading to higher employer contribution rates.



**NON-HAZARDOUS  
ASSUMED DISCOUNT RATE SENSITIVITY ANALYSIS**

	Decrease Discount Rate	Valuation Results	Increase Discount Rate
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 14,628,224,712	\$ 13,224,698,427	\$ 12,043,307,004
Actuarial Value of Assets	<u>2,112,286,498</u>	<u>2,112,286,498</u>	<u>2,112,286,498</u>
Unfunded Liability	\$ 12,515,938,214	\$ 11,112,411,929	\$ 9,931,020,506
Funded Ratio	14.44%	15.97%	17.54%
Contribution Rate	44.28%	41.98%	40.30%
Discount Rate	5.75%	6.75%	7.75%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 2,769,408,418	\$ 2,456,677,964	\$ 2,197,042,341
Actuarial Value of Assets	<u>743,270,060</u>	<u>743,270,060</u>	<u>743,270,060</u>
Unfunded Liability	\$ 2,026,138,358	\$ 1,713,407,904	\$ 1,453,772,281
Funded Ratio	26.84%	30.26%	33.83%
Contribution Rate	9.53%	8.41%	7.49%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>KERS Non-Hazardous Total</b>			
Actuarial Accrued Liability	\$ 17,397,633,130	\$ 15,681,376,391	\$ 14,240,349,345
Actuarial Value of Assets	<u>2,855,556,558</u>	<u>2,855,556,558</u>	<u>2,855,556,558</u>
Unfunded Liability	\$ 14,542,076,572	\$ 12,825,819,833	\$ 11,384,792,787
Funded Ratio	16.41%	18.21%	20.05%
Contribution Rate	53.81%	50.39%	47.79%
Discount Rate	5.75%/6.50%	6.75%/7.50%	7.75%/8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%



**NON-HAZARDOUS  
INFLATION ASSUMPTION SENSITIVITY ANALYSIS**

	Valuation Results	Decrease Inflation Rate 25 basis points	Decrease Inflation Rate 50 basis points
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 13,224,698,427	\$ 13,527,890,341	\$ 13,844,489,242
Actuarial Value of Assets	<u>2,112,286,498</u>	<u>2,112,286,498</u>	<u>2,112,286,498</u>
Unfunded Liability	\$ 11,112,411,929	\$ 11,415,603,843	\$ 11,732,202,744
Funded Ratio	15.97%	15.61%	15.26%
Contribution Rate	41.98%	43.39%	44.87%
Discount Rate	6.75%	6.50%	6.25%
Payroll Growth	4.00%	3.75%	3.50%
Inflation Rate	3.25%	3.00%	2.75%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 2,456,677,964	\$ 2,464,703,609	\$ 2,473,226,127
Actuarial Value of Assets	<u>743,270,060</u>	<u>743,270,060</u>	<u>743,270,060</u>
Unfunded Liability	\$ 1,713,407,904	\$ 1,721,433,549	\$ 1,729,956,067
Funded Ratio	30.26%	30.16%	30.05%
Contribution Rate	8.41%	8.49%	8.57%
Discount Rate	7.50%	7.25%	7.00%
Payroll Growth	4.00%	3.75%	3.50%
Inflation Rate	3.25%	3.00%	2.75%
<b>KERS Non-Hazardous Total</b>			
Actuarial Accrued Liability	\$ 15,681,376,391	\$ 15,992,593,950	\$ 16,317,715,369
Actuarial Value of Assets	<u>2,855,556,558</u>	<u>2,855,556,558</u>	<u>2,855,556,558</u>
Unfunded Liability	\$ 12,825,819,833	\$ 13,137,037,392	\$ 13,462,158,811
Funded Ratio	18.21%	17.86%	17.50%
Contribution Rate	50.39%	51.88%	53.44%
Discount Rate	6.75%/7.50%	6.50%/7.25%	6.25%/7.00%
Payroll Growth	4.00%	3.75%	3.50%
Inflation Rate	3.25%	3.00%	2.75%



**NON-HAZARDOUS  
PAYROLL GROWTH ASSUMPTION SENSITIVITY ANALYSIS**

	Valuation Results	Decrease Payroll Growth 2%	No Payroll Growth
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 13,224,698,427	\$ 13,224,698,427	\$ 13,224,698,427
Actuarial Value of Assets	<u>2,112,286,498</u>	<u>2,112,286,498</u>	<u>2,112,286,498</u>
Unfunded Liability	\$ 11,112,411,929	\$ 11,112,411,929	\$ 11,112,411,929
Funded Ratio	15.97%	15.97%	15.97%
Contribution Rate	41.98%	51.58%	62.66%
Discount Rate	6.75%	6.75%	6.75%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 2,456,677,964	\$ 2,456,677,964	\$ 2,456,677,964
Actuarial Value of Assets	<u>743,270,060</u>	<u>743,270,060</u>	<u>743,270,060</u>
Unfunded Liability	\$ 1,713,407,904	\$ 1,713,407,904	\$ 1,713,407,904
Funded Ratio	30.26%	30.26%	30.26%
Contribution Rate	8.41%	9.80%	11.35%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>KERS Non-Hazardous Total</b>			
Actuarial Accrued Liability	\$ 15,681,376,391	\$ 15,681,376,391	\$ 15,681,376,391
Actuarial Value of Assets	<u>2,855,556,558</u>	<u>2,855,556,558</u>	<u>2,855,556,558</u>
Unfunded Liability	\$ 12,825,819,833	\$ 12,825,819,833	\$ 12,825,819,833
Funded Ratio	18.21%	18.21%	18.21%
Contribution Rate	50.39%	61.38%	74.01%
Discount Rate	6.75%/7.50%	6.75%/7.50%	6.75%/7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%



**HAZARDOUS  
ASSUMED DISCOUNT RATE SENSITIVITY ANALYSIS**

	Decrease Discount Rate	Valuation Results	Increase Discount Rate
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 1,038,663,083	\$ 936,706,126	\$ 810,384,352
Actuarial Value of Assets	<u>559,487,184</u>	<u>559,487,184</u>	<u>559,487,184</u>
Unfunded Liability	\$ 479,175,899	\$ 377,218,942	\$ 250,897,168
Funded Ratio	53.87%	59.73%	69.04%
Contribution Rate	25.37%	20.48%	14.45%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 427,844,893	\$ 377,745,230	\$ 336,798,057
Actuarial Value of Assets	<u>473,160,173</u>	<u>473,160,173</u>	<u>473,160,173</u>
Unfunded Liability	\$ (45,315,280)	\$ (95,414,943)	\$ (136,362,116)
Funded Ratio	110.59%	125.26%	140.49%
Contribution Rate	4.78%	1.34%	-1.79%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>KERS Hazardous Total</b>			
Actuarial Accrued Liability	\$ 1,466,507,976	\$ 1,314,451,356	\$ 1,147,182,409
Actuarial Value of Assets	<u>1,032,647,357</u>	<u>1,032,647,357</u>	<u>1,032,647,357</u>
Unfunded Liability	\$ 433,860,619	\$ 281,803,999	\$ 114,535,052
Funded Ratio	70.42%	78.56%	90.02%
Contribution Rate	30.15%	21.82%	12.66%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%



**HAZARDOUS  
INFLATION ASSUMPTION SENSITIVITY ANALYSIS**

Valuation Results	Decrease Inflation Rate 25 basis points	Decrease Inflation Rate 50 basis points
<b>Retirement</b>		
Actuarial Accrued Liability	\$ 936,706,126	\$ 958,334,436
Actuarial Value of Assets	<u>559,487,184</u>	<u>559,487,184</u>
Unfunded Liability	\$ 377,218,942	\$ 398,847,252
Funded Ratio	59.73%	58.38%
Contribution Rate	20.48%	21.74%
Discount Rate	7.50%	7.25%
Payroll Growth	4.00%	3.75%
Inflation Rate	3.25%	3.00%
<b>Insurance</b>		
Actuarial Accrued Liability	\$ 377,745,230	\$ 379,209,930
Actuarial Value of Assets	<u>473,160,173</u>	<u>473,160,173</u>
Unfunded Liability	\$ (95,414,943)	\$ (93,950,243)
Funded Ratio	125.26%	124.78%
Contribution Rate	1.34%	1.51%
Discount Rate	7.50%	7.25%
Payroll Growth	4.00%	3.75%
Inflation Rate	3.25%	3.00%
<b>KERS Hazardous Total</b>		
Actuarial Accrued Liability	\$ 1,314,451,356	\$ 1,337,544,366
Actuarial Value of Assets	<u>1,032,647,357</u>	<u>1,032,647,357</u>
Unfunded Liability	\$ 281,803,999	\$ 304,897,009
Funded Ratio	78.56%	77.20%
Contribution Rate	21.82%	23.25%
Discount Rate	7.50%	7.25%
Payroll Growth	4.00%	3.75%
Inflation Rate	3.25%	3.00%



**HAZARDOUS  
PAYROLL GROWTH ASSUMPTION SENSITIVITY ANALYSIS**

	Valuation Results	Decrease Payroll Growth 2%	No Payroll Growth
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 936,706,126	\$ 936,706,126	\$ 936,706,126
Actuarial Value of Assets	<u>559,487,184</u>	<u>559,487,184</u>	<u>559,487,184</u>
Unfunded Liability	\$ 377,218,942	\$ 377,218,942	\$ 377,218,942
Funded Ratio	59.73%	59.73%	59.73%
Contribution Rate	20.48%	23.98%	27.99%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 377,745,230	\$ 377,745,230	\$ 377,745,230
Actuarial Value of Assets	<u>473,160,173</u>	<u>473,160,173</u>	<u>473,160,173</u>
Unfunded Liability	\$ (95,414,943)	\$ (95,414,943)	\$ (95,414,943)
Funded Ratio	125.26%	125.26%	125.26%
Contribution Rate	1.34%	0.53%	-0.36%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>KERS Hazardous Total</b>			
Actuarial Accrued Liability	\$ 1,314,451,356	\$ 1,314,451,356	\$ 1,314,451,356
Actuarial Value of Assets	<u>1,032,647,357</u>	<u>1,032,647,357</u>	<u>1,032,647,357</u>
Unfunded Liability	\$ 281,803,999	\$ 281,803,999	\$ 281,803,999
Funded Ratio	78.56%	78.56%	78.56%
Contribution Rate	21.82%	24.51%	27.63%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%



**Cavanaugh Macdonald**  
CONSULTING, LLC

*The experience and dedication you deserve*



## **Report on the Annual Valuation of the County Employees Retirement System**

**Prepared as of June 30, 2016**





# Cavanaugh Macdonald

CONSULTING, LLC

*The experience and dedication you deserve*

November 16, 2016

Board of Directors  
Kentucky Retirement Systems  
Perimeter Park West  
1260 Louisville Road  
Frankfort, KY 40601

Dear Members of the Board:

Presented in this report are the results for the annual actuarial valuation of the retirement and insurance benefits provided under the County Employees Retirement System (CERS). The purpose of the valuation was to measure the System's funding progress and to determine the required employer contribution rates for the fiscal year beginning July 1, 2017. The date of the valuation was June 30, 2016.

The valuation was based upon data, furnished by the Executive Director and the Kentucky Retirement Systems (KRS) staff, concerning active, inactive and retired members along with pertinent financial information. The complete cooperation of the KRS staff in furnishing materials requested is hereby acknowledged with appreciation.

To the best of our knowledge, this report is complete and accurate. The valuation was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. The valuation was prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board.

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein. The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the system, and on actuarial assumptions that are, in the aggregate, internally consistent and reasonably based on the actual experience of the system.

Respectfully submitted,

Todd B. Green ASA, FCA, MAAA  
Principal and Consulting Actuary

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## **TABLE OF CONTENTS**

<b><u>Section</u></b>	<b><u>Item</u></b>	<b><u>Page No.</u></b>
I	Summary of Principal Results	1
II	Membership Data	5
III	Assets	7
IV	Comments on Valuation	8
V	Derivation of Experience Gains and Losses	10
VI	Actuarially Determined Contribution Rates	15
VII	Accounting Information	18
<b><u>Schedule</u></b>		
A	Valuation Balance Sheet and Solvency Test	23
B	Development of Actuarial Value of Assets	31
C	Statement of Actuarial Assumptions and Methods	35
D	Summary of Main Benefit and Contribution Provisions	42
E	Detailed Tabulations of the Data	54
F	Sensitivity Analysis	64



**REPORT ON THE ANNUAL VALUATION OF THE  
COUNTY EMPLOYEES RETIREMENT SYSTEM**

**PREPARED AS OF JUNE 30, 2016**

**SECTION I – SUMMARY OF PRINCIPAL RESULTS**

This report, prepared as of June 30, 2016, presents the results of the annual actuarial valuation of the retirement and insurance benefits provided under the System. For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results, broken down between non-hazardous and hazardous members, are summarized in the following table.

**SUMMARY OF PRINCIPAL RESULTS**

	CERS Non-Hazardous		CERS Hazardous		CERS Totals	
	6/30/2016	6/30/2015	6/30/2016	6/30/2015	6/30/2016	6/30/2015
<b>Contributions for next fiscal year:</b>						
Retirement	14.48%	13.95%	22.20%	21.71%		
Insurance	<u>4.70</u>	<u>4.93</u>	<u>9.35</u>	<u>9.79</u>	N/A	N/A
Total	19.18%	18.88%	31.55%	31.50%		
<b>Funded status as of valuation date:</b>						
Retirement						
Actuarial accrued liability	\$11,076,456,794	\$10,740,325,421	\$3,704,456,223	\$3,613,307,547	\$14,780,913,017	\$14,353,632,968
Actuarial value of assets	\$6,535,372,347	\$6,474,848,513	\$2,139,119,173	\$2,096,782,956	\$8,674,491,520	\$8,571,631,469
Unfunded liability on actuarial value of assets	\$4,541,084,447	\$4,265,476,908	\$1,565,337,050	\$1,516,524,591	\$6,106,421,497	\$5,782,001,499
Funded ratio on actuarial value of assets	59.00%	60.29%	57.74%	58.03%	58.69%	59.72%
Market value of assets	\$6,106,186,908	\$6,416,853,506	\$2,003,669,273	\$2,073,397,045	\$8,109,856,181	\$8,490,250,551
Unfunded liability on market value of assets	\$4,970,269,886	\$4,323,471,915	\$1,700,786,950	\$1,539,910,502	\$6,671,056,836	\$5,863,382,417
Funded ratio on market value of assets	55.13%	59.75%	54.09%	57.38%	54.87%	59.15%
Insurance						
Actuarial accrued liability	\$2,988,121,117	\$2,907,827,440	\$1,558,818,204	\$1,504,015,233	\$4,546,939,321	\$4,411,842,673
Actuarial value of assets	\$2,079,811,055	\$1,997,456,463	\$1,135,784,220	\$1,087,707,118	\$3,215,595,275	\$3,085,163,581
Unfunded liability on actuarial value of assets	\$908,310,062	\$910,370,977	\$423,033,984	\$416,308,115	\$1,331,344,046	\$1,326,679,092
Funded ratio on actuarial value of assets	69.60%	68.69%	72.86%	72.32%	70.72%	69.93%
Market value of assets	\$1,943,756,727	\$1,948,454,097	\$1,062,602,089	\$1,061,560,788	\$3,006,358,816	\$3,010,014,885
Unfunded liability on market value of assets	\$1,044,364,390	\$959,373,343	\$496,216,115	\$442,454,445	\$1,540,580,505	\$1,401,827,788
Funded ratio on market value of assets	65.05%	67.01%	68.17%	70.58%	66.12%	68.23%
<b>Demographic data as of valuation date:</b>						
Number of retired participants and beneficiaries	56,339	52,651	8,563	8,034	64,902	60,685
Number of vested former members	14,357	13,649	775	708	15,132	14,357
Number of former members due a refund	67,935	66,530	2,055	1,948	69,990	68,478
Number of active members	80,664	80,852	9,084	9,172	89,748	90,024
Total salary	\$2,352,761,794	\$2,296,715,957	\$492,850,521	\$483,640,601	\$2,845,612,315	\$2,780,356,558
Average salary	\$29,167	\$28,406	\$54,255	\$52,730	\$31,707	\$30,885



The County Employees Retirement System is a defined benefit pension fund that provides pensions and health care coverage for employees of city and county governments, police officers and firefighters, non-teaching staff of local boards of education, circuit clerks, local library employees, and other local governmental agency employees. The County Employees Retirement System includes both non-hazardous and hazardous duty benefits. This report presents the results of the June 30, 2016 actuarial funding valuation for both the Retirement Plan and the Insurance Fund. The primary purpose of performing the actuarial funding valuations are to:

- Calculate the actuarially determined contribution rates for the fiscal year beginning July 1, 2017 for both the Retirement Plan and the Insurance Fund.
- Determine the experience of the System since the last valuation date.
- Disclose asset and liability measures as of the valuation date.
- Analyze and report on trends in contributions, assets, and liabilities over the past several years.

Since the previous valuation there were no changes to the plan provisions or actuarial methods and assumptions. The actuarial valuation results provide “snapshot” view the System’s financial condition on June 30, 2016. Actuarial gains and losses result when actuarial experience of the plan (such as asset return, pay increases, turnover, deaths, etc.) is different from the expected by the actuarial assumptions.

### **Non-Hazardous**

The Retirement Plan’s Unfunded Actuarial Accrued Liability (UAAL) was expected to be \$4,360.7 million taking into account contributions from both the employer and members of \$418.1 million. The actual UAAL was \$4,541.1 million. The increase of \$180.4 million was due to an actuarial loss due to actual experience different than what was anticipated by the assumptions. The Insurance Fund’s UAAL was expected to be \$925.9 million taking into account expected employer and member contributions of \$120.3 million. The actual UAAL was \$908.3 million. The decrease in the UAAL of \$17.6 million was due to an actuarial gain due to actuarial experience different than what was anticipated by the assumptions.

The remaining amortization period of the UAAL of both the Pension and Insurance Funds is 27-years as of June 30, 2016. Detailed analysis of the gains and losses are presented in Section V of the report.

As of June 30, 2016 the Pension and Insurance Funds had net assets of \$6,106,186,908 and \$1,943,756,727 respectively. The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the actuarially determined contribution. The asset valuation method which recognizes the annual unexpected portion of market value investment returns over a five-year period, attempts to dampen the effect of market volatility. The resulting amount is called the “actuarial value of assets” and is utilized to determine the actuarial valuation results. In this year’s actuarial valuation, the actuarial value of assets as of June 30, 2016 was \$6,535,372,347 and \$2,079,811,055 respectively for the Pension and Insurance Funds.



On a market basis, the estimated rate of return was (0.7)% and (0.1)% respectively for the Pension and Insurance Funds, assuming all cash flows occur in the middle of the year. Due to better than assumed prior returns on the market value of assets the net rate of return measured on the actuarial value of assets was 5.3% and 4.3% respectively for both the Pension and Insurance Funds. Please see Section III and Schedule B of this report for more detailed information on the market and actuarial value of assets.

### **Hazardous**

The Retirement Plan's Unfunded Actuarial Accrued Liability (UAAL) was expected to be \$1,533.3 million taking into account contributions from both the employer and members of \$157.3 million. The actual UAAL was \$1,565.3 million. The increase of \$32.0 million was due to an actuarial loss due to actual experience different than what was anticipated by the assumptions. The Insurance Fund's UAAL was expected to be \$423.4 million taking into account expected employer and member contributions of \$48.3 million. The actual UAAL was \$423.0 million. The decrease in the UAAL of \$0.4 million was due to an actuarial gain due to actuarial experience different than what was anticipated by the assumptions.

The remaining amortization period of the UAAL of both the Pension and Insurance Funds is 27-years as of June 30, 2016. Detailed analysis of the gains and losses are presented in Section V of the report.

As of June 30, 2016 the Pension and Insurance Funds had net assets of \$2,003,669,273 and \$1,062,602,089 respectively. The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the actuarially determined contribution. The asset valuation method which recognizes the annual unexpected portion of market value investment returns over a five-year period, attempts to dampen the effect of market volatility. The resulting amount is called the "actuarial value of assets" and is utilized to determine the actuarial valuation results. In this year's actuarial valuation, the actuarial value of assets as of June 30, 2016 was \$2,139,119,173 and \$1,135,784,220 respectively for the Pension and Insurance Funds.

On a market basis, the estimated rate of return was (0.5)% and 0.1% respectively for the Pension and Insurance Funds, assuming all cash flows occur in the middle of the year. Due to better than assumed prior returns on the market value of assets the net rate of return measured on the actuarial value of assets was 4.3% and 4.4% respectively for both the Pension and Insurance Funds. Please see Section III and Schedule B of this report for more detailed information on the market and actuarial value of assets.

Schedule F provides sensitivity analysis for three different sets of economic assumptions; the discount rate assumption, the inflation assumption, and the payroll growth assumption. Two assumption change scenarios are presented for each economic assumption. The results of the economic assumption change scenarios are presented along with the valuation results for comparison.



The long-term financial health of this retirement System, like all retirement systems, is heavily dependent on two key items: (1) future investment returns and (2) contributions to the System. The System has recently been strengthened by eliminating unfunded ad hoc cost-of-living adjustments for retirees. The cost for providing these benefit increase must be prefunded in advance.



**SECTION II – MEMBERSHIP DATA**

Data regarding the membership of the System for use as a basis for the valuation were furnished by the System’s office. The following table summarizes the membership of the system as of June 30, 2016 upon which the valuation was based. Detailed tabulations of the data are given in Schedule E.

**Active Members**

Employee Group	Number	Payroll	Group Averages		
			Salary	Age	Service
Non-Hazardous	80,664	\$2,352,761,794	\$29,167	47.9	9.4
Hazardous	9,084	492,850,521	54,255	39.1	10.6
<b>Total in CERS</b>	<b>89,748</b>	<b>\$2,845,612,315</b>	<b>\$31,707</b>	<b>47.0</b>	<b>9.5</b>

The following tables show a six-year history of active member valuation data.

**SCHEDULE OF NON-HAZARDOUS CERS ACTIVE MEMBER VALUATION DATA**

Valuation Date	Number	Annual Payroll	Annual Average Pay	% Increase in Average Pay
6/30/2011	85,285	\$2,276,595,948	\$26,694	1.1%
6/30/2012	83,052	2,236,546,345	26,929	0.9
6/30/2013	81,815	2,236,277,489	27,333	1.5
6/30/2014	81,115	2,272,270,287	28,013	2.5
6/30/2015	80,852	2,296,715,957	28,406	1.4
6/30/2016	80,664	2,352,761,794	29,167	2.7

**SCHEDULE OF HAZARDOUS CERS ACTIVE MEMBER VALUATION DATA**

Valuation Date	Number	Annual Payroll	Annual Average Pay	% Increase in Average Pay
6/30/2011	9,407	\$466,963,860	\$49,640	1.7%
6/30/2012	9,130	464,228,923	50,847	2.4
6/30/2013	9,123	461,672,567	50,605	(0.5)
6/30/2014	9,194	479,164,016	52,117	3.0
6/30/2015	9,172	483,640,601	52,730	1.2
6/30/2016	9,084	492,850,521	54,255	2.9



The following tables show the number and annual retirement allowances payable to retired members and their beneficiaries on the roll of the Retirement System as of the valuation date as well as certain group averages.

**Non-Hazardous Retired Lives**

Type of Benefit Payment	Number*	Annual Benefits*	Group Averages	
			Benefit	Age
Retiree	47,311	\$546,051,198	\$11,542	70.0
Disability	3,951	43,921,768	11,117	64.7
Beneficiary	5,077	44,616,974	8,788	67.6
Total in CERS	56,339	\$634,589,940	\$11,264	69.4

\* Does not include number and annual benefits for those members included in the hazardous system who are also receiving benefits from the non-hazardous system. There were 3,004 members in the hazardous system also receiving an annual benefit from the non-hazardous System. Total annual benefits for these members is \$20,206,376.

**Hazardous Retired Lives**

Type of Benefit Payment	Number	Annual Benefits	Group Averages	
			Benefit	Age
Retiree	7,045	\$192,218,028	\$27,284	61.6
Disability	519	8,535,810	16,447	55.9
Beneficiary	999	14,548,263	14,563	56.6
Total in CERS	8,563	\$215,302,101	\$25,143	60.6

This valuation also includes 85,122 inactive members (82,292 Non-Hazardous and 2,830 Hazardous; of which 14,357 Non-Hazardous are vested and 775 Hazardous are vested).



**SECTION III – ASSETS**

- As of June 30, 2016 the total market value of assets amounted to \$11,116,214,997 as shown in the following table. The Insurance assets include both the amount in the health care trust and the amount in the 401(h) account in the pension trust established to meet the requirements of HB1.

**MARKET VALUE OF ASSETS BY FUND  
AS OF JUNE 30, 2016**

Member Group	Retirement	Insurance	CERS Total
Non-Hazardous	\$6,106,186,908	\$1,943,756,727	\$8,049,943,635
Hazardous	<u>2,003,669,273</u>	<u>1,062,602,089</u>	<u>3,066,271,362</u>
Total	\$8,109,856,181	\$3,006,358,816	\$11,116,214,997

- The five-year smoothed market related actuarial value of assets used for the current valuation was \$11,890,086,795. Schedule B shows the development of the actuarial value of assets as of June 30, 2016. The following table shows the actuarial value of assets allocated among member groups.

**COMPARISON OF ACTUARIAL VALUE OF ASSETS**

	JUNE 30, 2016	JUNE 30, 2015
<b>Retirement</b>		
Non-Hazardous	\$ 6,535,372,347	\$ 6,474,848,513
Hazardous	<u>2,139,119,173</u>	<u>2,096,782,956</u>
Total	\$ 8,674,491,520	\$ 8,571,631,469
<b>Insurance</b>		
Non-Hazardous	\$ 2,079,811,055	\$ 1,997,456,463
Hazardous	<u>1,135,784,220</u>	<u>1,087,707,118</u>
Total	\$ 3,215,595,275	\$ 3,085,163,581
<b>CERS Total</b>		
Non-Hazardous	\$ 8,615,183,402	\$ 8,472,304,976
Hazardous	<u>3,274,903,393</u>	<u>3,184,490,074</u>
Total	\$ 11,890,086,795	\$ 11,656,795,050



## **SECTION IV - COMMENTS ON VALUATION**

Schedule A of this report contains the valuation balance sheets which show the present and prospective assets and liabilities of the System as of June 30, 2016. Separate balance sheets are shown for each employee group as well as in total for all groups.

### **Retirement**

1. The total valuation balance sheet on account of retirement benefits shows that the System has total prospective retirement benefit liabilities of \$16,689,498,454, of which \$8,748,599,240 is for the prospective benefits payable on account of present retired members and beneficiaries of deceased members, \$425,642,074 is for the prospective benefits payable on account of inactive members and \$7,515,257,140 is for the prospective benefits payable on account of present active members. Against these retirement benefit liabilities the System has a total present actuarial value of assets of \$8,674,491,520 as of June 30, 2016. The difference of \$8,015,006,934 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of retirement benefits. Of this amount, \$1,283,806,888 is the present value of future contributions expected to be made by members, and the balance of \$6,731,200,046 represents the present value of future contributions payable by the employers.
2. The employers' contributions to the System on account of retirement benefits consist of normal contributions, accrued liability contributions and contributions for administrative expenses. The valuation indicates that employer normal contributions at the rate of 2.92% of payroll for non-hazardous members and 4.13% of payroll for hazardous members are required to fund the continuing benefit accruals for the average active member of CERS.
3. Prospective employer normal contributions on account of retirement benefits at the above rates have a present value of \$624,778,549. When this amount is subtracted from \$6,731,200,046, which is the present value of the total future contributions to be made by the employers, there remains \$6,106,421,497 as the amount of future accrued liability contributions.
4. For non-hazardous members, it is recommended that the accrued liability contribution rate payable by the Counties on account of retirement benefits be set at 10.78% of payroll. For hazardous members, it is recommended that the accrued liability contribution rate payable by the participating employers on account of retirement benefits be set at 17.80% of payroll. These rates are sufficient to liquidate the unfunded accrued liability of \$4,541,084,447 for non-hazardous members and \$1,565,337,050 for hazardous members over 27 years on the assumption that the aggregate payroll for non-hazardous and hazardous members will increase by 4.00% each year.
5. For non-hazardous members, the contribution rate for administrative expenses is determined to be 0.78% of payroll. For hazardous members, the contribution rate for administrative expenses is determined to be 0.27% of payroll.



## Insurance

1. The total valuation balance sheet on account of insurance benefits shows that the System has total prospective insurance benefit liabilities of \$5,206,254,745, of which \$2,181,578,059 is for the prospective benefits payable on account of present retired members and beneficiaries of deceased members, \$182,718,859 is for the prospective benefits payable on account of inactive members and \$2,841,957,827 is for the prospective benefits payable on account of present active members. Against these insurance benefit liabilities the System has a total present actuarial value of assets of \$3,215,595,275 as of June 30, 2016. The difference of \$1,990,659,470 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of insurance benefits. Of this amount, \$92,598,841 is the present value of future contributions expected to be made by members, and the balance of \$1,898,060,629 represents the present value of future contributions payable by the employers.
2. The employers' contributions to the System on account of insurance benefits consist of normal contributions and accrued liability contributions. The valuation indicates that employer normal contributions at the rate of 2.54% of payroll for non-hazardous members and 4.55% of payroll for hazardous members are required to fund the continuing benefit accruals for the average active member of CERS.
3. Prospective employer normal contributions on account of insurance benefits at the above rates have a present value of \$566,716,583. When this amount is subtracted from \$1,898,060,629, which is the present value of the total future contributions to be made by the employers, there remains \$1,331,344,046 as the amount of future accrued liability contributions.
4. For non-hazardous members, it is recommended that the accrued liability contribution rate payable by the Counties on account of insurance benefits be set at 2.13% of payroll. For hazardous members, it is recommended that the accrued liability contribution rate payable by the participating employers on account of insurance benefits be set at 4.73% of payroll. These rates are sufficient to liquidate the unfunded accrued liability of \$908,310,062 for non-hazardous members and \$423,033,984 for hazardous members over 27 years on the assumption that the aggregate payroll for non-hazardous and hazardous members will increase by 4.00% each year.
5. The contribution rate for administrative expenses is determined to be 0.03% of payroll for non-hazardous employees and 0.07% of payroll for hazardous employees.



**SECTION V – DERIVATION OF EXPERIENCE GAINS AND LOSSES**

Actual experience will never (except by coincidence) coincide exactly with assumed experience. It is assumed that gains and losses will be in balance over a period of years, but sizable year to year fluctuations are common. Detail on the derivation of the experience gain (loss) for the year ended June 30, 2016 is shown below (\$ millions).

**Experience Gain/(Loss)  
Retirement Benefits**

		Non-Hazardous Group	Hazardous Group	Total
(1)	UAAL* as of 6/30/15	\$ 4,265.5	\$ 1,516.5	\$ 5,782.0
(2)	Normal cost from last valuation	194.5	61.6	256.1
(3)	Contributions	418.1	157.3	575.4
(4)	Interest accrual: [(1) + (2)] x .075 - (3) x .0375	318.8	112.5	431.3
(5)	Expected UAAL before changes: (1) + (2) - (3) + (4)	\$ 4,360.7	\$ 1,533.3	\$ 5,894.0
(6)	Change due to new actuarial assumption or methods	0.0	0.0	0.0
(7)	Expected UAAL after changes: (5) - (6)	\$ 4,360.7	\$ 1,533.3	\$ 5,894.0
(8)	Actual UAAL as of 6/30/16	\$ 4,541.1	\$ 1,565.3	\$ 6,106.4
(9)	Gain/(loss): (7) - (8)	\$ (180.4)	\$ (32.0)	\$ (212.4)
(10)	Accrued liabilities as of 6/30/15	\$ 10,740.3	\$ 3,613.3	\$ 14,353.6
(11)	Gain/(loss) as percent of actuarial accrued liabilities at start of year	(1.7)%	(0.9)%	(1.5)%

\*Unfunded actuarial accrued liability



**Experience Gain/(Loss)  
Insurance Benefits**

		Non-Hazardous Group	Hazardous Group	Total
(1)	UAAL* as of 6/30/15	\$ 910.4	\$ 416.3	\$ 1,326.7
(2)	Normal cost from last valuation	71.2	25.9	97.1
(3)	Expected contributions	<u>120.3</u>	<u>48.3</u>	<u>168.6</u>
(4)	Interest accrual: [(1) + (2) - (3)] x .075	64.6	29.5	94.1
(5)	Expected UAAL before changes: (1) + (2) - (3) + (4)	\$ 925.9	\$ 423.4	\$ 1,349.3
(6)	Change due to new actuarial assumption or methods	0.0	0.0	0.0
(7)	Expected UAAL after changes: (5) - (6)	\$ 925.9	\$ 423.4	\$ 1,349.3
(8)	Actual UAAL as of 6/30/16	\$ 908.3	\$ 423.0	\$ 1,331.3
(9)	Gain/(loss): (7) - (8)	\$ 17.6	\$ 0.4	\$ 18.0
(10)	Accrued liabilities as of 6/30/15	\$ 2,907.8	\$ 1,504.0	\$ 4,411.8
(11)	Gain/(loss) as percent of actuarial accrued liabilities at start of year	0.6 %	0.0 %	0.4 %

\* *Unfunded actuarial accrued liability*



**NON-HAZARDOUS CERS MEMBERS  
ANALYSIS OF FINANCIAL EXPERIENCE**

**Gains & Losses in Accrued Liabilities  
Resulting from Difference Between  
Assumed Experience & Actual Experience  
(\$ Millions)**

Type of Activity	Retirement \$ Gain (or Loss) For Year Ending 6/30/16	Insurance \$ Gain (or Loss) For Year Ending 6/30/16
<b>Age &amp; Service Retirements.</b> If members retire at older ages, there is a gain. If younger ages, a loss.	\$ (81.2)	\$ 7.1
<b>Disability Retirements.</b> If disability claims are less than assumed, there is a gain. If more claims, a loss.	(30.3)	(1.5)
<b>Death-in Service Benefits.</b> If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	(1.3)	(2.0)
<b>Withdrawal From Employment.</b> If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	75.9	26.5
<b>Pay or Claims Increases.</b> If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss. For insurance, smaller claims increases than assumed creates a gain; larger, a loss.	23.5	83.8
<b>New Members.</b> Additional unfunded accrued liability will produce a loss.	(18.6)	(20.1)
<b>Investment Income.</b> If there is a greater investment income than assumed, there is a gain. If less income, a loss.	(148.8)	(64.0)
<b>Death or Waiver After Retirement.</b> If retired members live longer than assumed, there is a loss. If not as long, a gain. If retired members receiving health benefits later waive coverage, there is a gain.	1.2	33.6
<b>Other.</b> Miscellaneous gains and losses resulting from changes in valuation software, data adjustments, timing of financial transactions, insurance election changes, etc.	<u>(0.8)</u>	<u>(45.8)</u>
<b>Gain (or Loss) During Year From Financial Experience</b>	\$ (180.4)	\$ 17.6
<b>Non-Recurring Items.</b> Adjustments for plan amendments, assumption changes, method changes and data corrections	<u>0.0</u>	<u>0.0</u>
<b>Composite Gain (or Loss) During Year</b>	\$ (180.4)	\$ 17.6



**HAZARDOUS CERS MEMBERS  
ANALYSIS OF FINANCIAL EXPERIENCE**

**Gains & Losses in Accrued Liabilities  
Resulting from Difference Between  
Assumed Experience & Actual Experience  
(\$ Millions)**

Type of Activity	Retirement \$ Gain (or Loss) For Year Ending 6/30/16	Insurance \$ Gain (or Loss) For Year Ending 6/30/16
<b>Age &amp; Service Retirements.</b> If members retire at older ages, there is a gain. If younger ages, a loss.	\$ (233.5)	\$ (5.7)
<b>Disability Retirements.</b> If disability claims are less than assumed, there is a gain. If more claims, a loss.	(9.2)	0.9
<b>Death-in Service Benefits.</b> If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	0.0	(0.9)
<b>Withdrawal From Employment.</b> If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	19.2	(0.1)
<b>Pay or Claims Increases.</b> If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss. For insurance, smaller claims increases than assumed creates a gain; larger, a loss.	(3.8)	63.1
<b>New Members.</b> Additional unfunded accrued liability will produce a loss.	(7.9)	(3.8)
<b>Investment Income.</b> If there is a greater investment income than assumed, there is a gain. If less income, a loss.	(52.2)	(33.4)
<b>Death or Waiver After Retirement.</b> If retired members live longer than assumed, there is a loss. If not as long, a gain. If retired members receiving health benefits later waive coverage, there is a gain.	255.6	18.2
<b>Other.</b> Miscellaneous gains and losses resulting from changes in valuation software, data adjustments, timing of financial transactions, insurance election changes, etc.	<u>(0.3)</u>	<u>(37.9)</u>
<b>Gain (or Loss) During Year From Financial Experience</b>	\$ (32.0)	\$ 0.4
<b>Non-Recurring Items.</b> Adjustments for plan amendments, assumption changes, method changes and data corrections	<u>0.0</u>	<u>0.0</u>
<b>Composite Gain (or Loss) During Year</b>	\$ (32.0)	\$ 0.4



**TOTAL CERS MEMBERS  
ANALYSIS OF FINANCIAL EXPERIENCE**

**Gains & Losses in Accrued Liabilities  
Resulting from Difference Between  
Assumed Experience & Actual Experience  
(\$ Millions)**

Type of Activity	Retirement \$ Gain (or Loss) For Year Ending 6/30/16	Insurance \$ Gain (or Loss) For Year Ending 6/30/16
<b>Age &amp; Service Retirements.</b> If members retire at older ages, there is a gain. If younger ages, a loss.	\$ (314.7)	\$ 1.4
<b>Disability Retirements.</b> If disability claims are less than assumed, there is a gain. If more claims, a loss.	(39.5)	(0.6)
<b>Death-in Service Benefits.</b> If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	(1.3)	(2.9)
<b>Withdrawal From Employment.</b> If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	95.1	26.4
<b>Pay or Claims Increases.</b> If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss. For insurance, smaller claims increases than assumed creates a gain; larger, a loss.	19.7	146.9
<b>New Members.</b> Additional unfunded accrued liability will produce a loss.	(26.5)	(23.9)
<b>Investment Income.</b> If there is a greater investment income than assumed, there is a gain. If less income, a loss.	(201.0)	(97.4)
<b>Death or Waiver After Retirement.</b> If retired members live longer than assumed, there is a loss. If not as long, a gain. If retired members receiving health benefits later waive coverage, there is a gain.	256.8	51.8
<b>Other.</b> Miscellaneous gains and losses resulting from changes in valuation software, data adjustments, timing of financial transactions, insurance election changes, etc.	<u>(1.1)</u>	<u>(83.7)</u>
<b>Gain (or Loss) During Year From Financial Experience</b>	\$ (212.5)	\$ 18.0
<b>Non-Recurring Items.</b> Adjustments for plan amendments, assumption changes, method changes and data corrections	<u>0.0</u>	<u>0.0</u>
<b>Composite Gain (or Loss) During Year</b>	\$ (212.5)	\$ 18.0



## **SECTION VI – ACTUARIALLY DETERMINED CONTRIBUTION RATES**

The valuation balance sheet gives the basis for determining the percentage rates for contributions to be made by employers to the Retirement System. The following tables show the rates of contribution payable by employers as determined from the present valuation for the 2017/2018 fiscal year.

### **Actuarially Determined Contribution Rates Non-Hazardous Retirement**

<b>Contribution Rate for</b>	<b>% of Payroll</b>
A. Normal Cost:	
(1) Service retirement benefits	7.56%
(2) Disability benefits	0.27%
(3) Survivor benefits	0.09%
(4) Total	<u>7.92%</u>
B. Member Contributions	5.00%
C. Employer Normal Cost: [A(4) - B]	2.92%
D. Administrative Expenses	0.78%
E. Unfunded Actuarial Accrued Liability Contributions*:	10.78%
F. Total Recommended Employer Contribution Rate: [C+D+E]	14.48%

*\*Based on 27 year amortization of the UAAL from June 30, 2016*



**Actuarially Determined Contribution Rates  
Hazardous Retirement**

<b>Contribution Rate for</b>	<b>% of Payroll</b>
A. Normal Cost:	
(1) Service retirement benefits	11.58%
(2) Disability benefits	0.43%
(3) Survivor benefits	0.12%
(4) Total	<u>12.13%</u>
B. Member Contributions	8.00%
C. Employer Normal Cost: [A(4) - B]	4.13%
D. Administrative Expenses	0.27%
Unfunded Actuarial Accrued Liability	
E. Contributions*:	17.80%
F. Total Recommended Employer Contribution Rate: [C+D+E]	22.20%

*\*Based on 27 year amortization of the UAAL from June 30, 2016*



**Actuarially Determined Contribution Rates  
Non-Hazardous Insurance**

Contribution for		% of Payroll
A.	Normal Cost:	2.90%
B.	Member Contributions*	0.36%
C.	Employer Normal Cost: [A - B]	2.54%
D.	Administrative Expenses	0.03%
E.	Unfunded Actuarial Accrued Liability**:	2.13%
F.	Total Recommended Employer Contribution Rate: [C+D+E]	4.70%

*\*The liabilities are net of retiree contributions toward their healthcare.*

*\*\* Based on 27 year amortization of the UAAL from June 30, 2016*

**Actuarially Determined Contribution Rates  
Hazardous Insurance**

Contribution for		% of Payroll
A.	Normal Cost:	4.85%
B.	Member Contributions*	0.30%
C.	Employer Normal Cost: [A - B]	4.55%
D.	Administrative Expenses	0.07%
E.	Unfunded Actuarial Accrued Liability**:	4.73%
F.	Total Recommended Employer Contribution Rate: [C+D+E]	9.35%

*\*The liabilities are net of retiree contributions toward their healthcare.*

*\*\* Based on 27 year amortization of the UAAL from June 30, 2016*



**SECTION VII - ACCOUNTING INFORMATION**

Governmental Accounting Standards Board Statements (GASB) 43, 45, 67 and 68 set forth certain items of required supplementary information to be disclosed in the financial statements of the System and the employer. The information required under GASB 67 and 68 will be issued in separate reports. We are providing the retirement benefit information for information purposes only. One such item is a distribution of the number of employees by type of membership, as follows:

**NUMBER OF ACTIVE AND RETIRED MEMBERS  
AS OF JUNE 30, 2016**

GROUP	NUMBER		
	Non-Hazardous	Hazardous	Total
Retirees and beneficiaries currently receiving benefits	56,339	8,563	64,902
Terminated employees entitled to benefits but not yet receiving benefits	82,292	2,830	85,122
Active Members	<u>80,664</u>	<u>9,084</u>	<u>89,748</u>
Total	219,295	20,477	239,772

*\* Does not include number and annual benefits for those members included in the hazardous system who are also receiving benefits from the non-hazardous system. There were 3,004 members in in the hazardous system also receiving an annual benefit from the non-hazardous system.*

Another such item is the Schedule of Funding Progress for retirement and insurance benefits separately as shown in the following tables. Please note that for the retiree health care liabilities of those under age 65, the current premium charged by the Kentucky Employees' Health Plan (KEHP) is used as the base cost and is projected forward using the health care trend assumption. No implicit rate subsidy is calculated or recognized as the implicit rate subsidy is deemed the responsibility of the KEHP. Under Actuarial Standard of Practice No. 6 (ASOP No. 6), aging subsidies (or implicit rate subsidies) should be recognized, as the differences in health care utilization and cost due to age have been demonstrated and well quantified. The impact of aging on a valuation's results can be as significant as the use of mortality, trend, and discounting. It has been the long-standing position that the responsibility for compliance with GASB Statement No. 43, when it relates to KEHP implicit subsidies, rests with KEHP, not KRS, as KRS has no operational authority over KEHP. As such, KEHP implicit subsidies are excluded from the OPEB valuation process of the Retiree Medical Plan. As GASB 74 and 75 prohibit such a deviation from ASOP No. 6, additional consideration to the current treatment of KEHP implicit rate subsidies may be needed in the future. The estimated impact of KEHP implicit subsidies to the actuarial accrued liability is an increase of \$380,865,151 for CERS non-hazardous and \$193,213,657 for CERS hazardous.



**RETIREMENT BENEFITS  
SCHEDULE OF FUNDING PROGRESS**

Actuarial Valuation Date	Value of Plan Assets ( a )	Actuarial Accrued Liability (AAL) Entry Age ( b )	Unfunded AAL (UAAL) ( b - a )	Funded Ratio ( a / b )	Covered Payroll ( c )	UAAL as a Percentage of Covered Payroll ( ( b - a ) / ( c ) )
<b>Non-Hazardous Members</b>						
6/30/2011	\$ 5,629,611,183	\$ 8,918,085,025	\$ 3,288,473,842	63.1%	\$ 2,276,595,948	144.4%
6/30/2012	5,547,235,599	9,139,567,695	3,592,332,096	60.7	2,236,546,345	160.6
6/30/2013	5,637,094,483	9,378,876,114	3,741,781,631	60.1	2,236,277,489	167.3
6/30/2014	6,117,133,692	9,772,522,616	3,655,388,924	62.6	2,272,270,287	160.9
6/30/2015*	6,474,848,513	10,740,325,421	4,265,476,908	60.3	2,296,715,957	185.7
6/30/2016	6,535,372,347	11,076,456,794	4,541,084,447	59.0	2,352,761,794	193.0
<b>Hazardous Members</b>						
6/30/2011	\$ 1,779,545,393	\$ 2,859,041,052	\$ 1,079,495,659	62.2%	\$ 466,963,860	231.2%
6/30/2012	1,747,379,297	3,009,992,047	1,262,612,750	58.1	464,228,923	272.0
6/30/2013	1,801,691,410	3,124,205,593	1,322,514,183	57.7	461,672,567	286.5
6/30/2014	1,967,640,027	3,288,825,753	1,321,185,726	59.8	479,164,016	275.7
6/30/2015*	2,096,782,956	3,613,307,547	1,516,524,591	58.0	483,640,601	313.6
6/30/2016	2,139,119,173	3,704,456,223	1,565,337,050	57.7	492,850,521	317.6
<b>Total CERS Members</b>						
6/30/2011	\$ 7,409,156,576	\$ 11,777,126,077	\$ 4,367,969,501	62.9%	\$ 2,743,559,808	159.2%
6/30/2012	7,294,614,896	12,149,559,743	4,854,944,847	60.0	2,700,775,268	179.8
6/30/2013	7,438,785,893	12,503,081,707	5,064,295,814	59.5	2,697,950,056	187.7
6/30/2014	8,084,773,719	13,061,348,369	4,976,574,650	61.9	2,751,434,303	180.9
6/30/2015*	8,571,631,469	14,353,632,968	5,782,001,499	59.7	2,780,356,558	208.0
6/30/2016	8,674,491,520	14,780,913,017	6,106,421,497	58.7	2,845,612,315	214.6

\* Discount rate changed from 7.75% to 7.50%



**INSURANCE BENEFITS  
SCHEDULE OF FUNDING PROGRESS**

Actuarial Valuation Date	Value of Plan Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b - a) / (c))
<b>Non-Hazardous Members</b>						
6/30/2011	\$ 1,433,450,793	\$ 3,073,973,205	\$ 1,640,522,412	46.6%	\$ 2,276,595,948	72.1%
6/30/2012	1,512,853,851	2,370,771,288	857,917,437	63.8	2,236,546,345	38.4
6/30/2013	1,628,244,197	2,443,894,100	815,649,903	66.6	2,236,277,489	36.5
6/30/2014	1,831,199,465	2,616,914,600	785,715,135	70.0	2,272,270,287	34.6
6/30/2015*	1,997,456,463	2,907,827,440	910,370,977	68.7	2,296,715,957	39.6
6/30/2016	2,079,811,055	2,988,121,117	908,310,062	69.6	2,352,761,794	38.6
<b>Hazardous Members</b>						
6/30/2011	\$ 770,790,274	\$ 1,647,702,755	\$ 876,912,481	46.8%	\$ 466,963,860	187.8%
6/30/2012	829,040,842	1,364,843,057	535,802,215	60.7	464,228,923	115.4
6/30/2013	892,774,391	1,437,332,817	544,558,426	62.1	461,672,567	118.0
6/30/2014	997,733,237	1,493,864,379	496,131,142	66.8	479,164,016	103.5
6/30/2015*	1,087,707,118	1,504,015,233	416,308,115	72.3	483,640,601	86.1
6/30/2016	1,135,784,220	1,558,818,204	423,033,984	72.9	492,850,521	85.8
<b>Total CERS Members</b>						
6/30/2011	\$ 2,204,241,067	\$ 4,721,675,960	\$ 2,517,434,893	46.7%	\$ 2,743,559,808	91.8%
6/30/2012	2,341,894,693	3,735,614,345	1,393,719,652	62.7	2,700,775,268	51.6
6/30/2013	2,521,018,588	3,881,226,917	1,360,208,329	65.0	2,697,950,056	50.4
6/30/2014	2,828,932,702	4,110,778,979	1,281,846,277	68.8	2,751,434,303	46.6
6/30/2015*	3,085,163,581	4,411,842,673	1,326,679,092	69.9	2,780,356,558	47.7
6/30/2016	3,215,595,275	4,546,939,321	1,331,344,046	70.7	2,845,612,315	46.8

\* Discount rate changed from 7.75% to 7.50%



**INSURANCE BENEFITS  
SCHEDULE OF EMPLOYER CONTRIBUTIONS**

<b>Year Ended</b>	<b>Annual Required Contribution</b>	<b>Employer Contributions</b>	<b>Percentage Contributed</b>
<b>Non-Hazardous Members</b>			
June 30, 2011	\$ 213,429,424	\$ 186,885,576	87.6%
June 30, 2012	214,421,008	171,924,836	80.2%
June 30, 2013	195,560,870	159,992,643	81.8%
June 30, 2014	130,651,800	123,278,028	94.4%
June 30, 2015	119,510,589	119,443,608	99.9%
June 30, 2016	110,987,287	111,836,358	100.8%
<b>Hazardous Members</b>			
June 30, 2011	\$ 109,226,667	\$ 98,592,286	90.3%
June 30, 2012	110,762,577	92,563,664	83.6%
June 30, 2013	102,010,672	85,319,393	83.6%
June 30, 2014	74,360,438	74,791,619	100.6%
June 30, 2015	69,102,811	71,778,130	103.9%
June 30, 2016	64,253,032	67,619,149	105.2%
<b>Total CERS Members</b>			
June 30, 2011	\$ 322,656,091	\$ 285,477,862	88.5%
June 30, 2012	325,183,585	264,488,500	81.3%
June 30, 2013	297,571,542	245,312,036	82.4%
June 30, 2014	205,012,238	198,069,647	96.6%
June 30, 2015	188,613,400	191,221,738	101.4%
June 30, 2016	175,240,319	179,455,507	102.4%



The information presented in the required supplementary schedules was determined as part of the actuarial valuation at June 30, 2016. Additional information as of the latest actuarial valuation follows.

### Insurance Benefits

	Non-Hazardous Members	Hazardous Members
Valuation date	6/30/2016	6/30/2016
Actuarial cost method	Entry Age	Entry Age
Amortization	Level percent Closed	Level percent Closed
Remaining amortization period	27 years	27 years
Asset valuation method	5 year smoothed Market	5 year smoothed Market
Medical Trend Assumption (Pre-Medicare)	7.50% - 5.00%	7.50% - 5.00%
Medical Trend Assumption (Post-Medicare)	5.50% - 5.00%	5.50% - 5.00%
Year Ultimate Trend	2021	2021
Dollar Contribution Trend	1.50%	1.50%
Actuarial assumptions:		
Investment rate of return*	7.50%	7.50%
*Includes price inflation at	3.25%	3.25%



## SCHEDULE A

### Valuation Balance Sheet and Solvency Test

The following valuation balance sheets show the assets and liabilities of the retirement system as of the current valuation date of June 30, 2016 and, for comparison purposes, as of the immediately preceding valuation date of June 30, 2015. The items shown in the balance sheet are present values actuarially determined as of the relevant valuation date.

#### VALUATION BALANCE SHEETS SHOWING THE ASSETS AND LIABILITIES OF THE COUNTY EMPLOYEES RETIREMENT SYSTEM

#### RETIREMENT BENEFITS NON-HAZARDOUS CERS MEMBERS

	June 30, 2016	June 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 6,535,372,347	\$ 6,474,848,513
Prospective contributions		
Member contributions	\$ 1,002,004,882	\$ 976,915,537
Employer normal contributions	525,861,024	542,240,368
Unfunded accrued liability contributions	<u>4,541,084,447</u>	<u>4,265,476,908</u>
Total prospective contributions	<u>\$ 6,068,950,353</u>	<u>\$ 5,784,632,813</u>
Total assets	<u>\$ 12,604,322,700</u>	<u>\$ 12,259,481,326</u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 6,410,536,524	\$ 6,142,108,967
Present value of benefits payable on account of active members	5,818,792,981	5,769,618,592
Present value of benefits payable on account of inactive members	<u>374,993,195</u>	<u>347,753,767</u>
Total liabilities	<u>\$ 12,604,322,700</u>	<u>\$ 12,259,481,326</u>



**VALUATION BALANCE SHEET  
RETIREMENT BENEFITS  
HAZARDOUS CERS MEMBERS**

	June 30, 2016	June 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 2,139,119,173	\$ 2,096,782,956
Prospective contributions		
Member contributions	\$ 281,802,006	\$ 276,305,209
Employer normal contributions	98,917,525	116,909,870
Unfunded accrued liability contributions	<u>1,565,337,050</u>	<u>1,516,524,591</u>
Total prospective contributions	<u>\$ 1,946,056,581</u>	<u>\$ 1,909,739,670</u>
 Total assets	 <u>\$ 4,085,175,754</u>	 <u>\$ 4,006,522,626</u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 2,338,062,716	\$ 2,254,151,236
 Present value of benefits payable on account of active members	 1,696,464,159	 1,708,819,459
 Present value of benefits payable on account of inactive members	 <u>50,648,879</u>	 <u>43,551,931</u>
 Total liabilities	 <u>\$ 4,085,175,754</u>	 <u>\$ 4,006,522,626</u>



**VALUATION BALANCE SHEET  
RETIREMENT BENEFITS  
TOTAL CERS MEMBERS**

	June 30, 2016	June 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 8,674,491,520	\$ 8,571,631,469
Prospective contributions		
Member contributions	\$ 1,283,806,888	\$ 1,253,220,746
Employer normal contributions	624,778,549	659,150,238
Unfunded accrued liability contributions	<u>6,106,421,497</u>	<u>5,782,001,499</u>
Total prospective contributions	<u>\$ 8,015,006,934</u>	<u>\$ 7,694,372,483</u>
 Total assets	 <u><u>\$ 16,689,498,454</u></u>	 <u><u>\$ 16,266,003,952</u></u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 8,748,599,240	\$ 8,396,260,203
 Present value of benefits payable on account of active members	 7,515,257,140	 7,478,438,051
 Present value of benefits payable on account of inactive members	 <u>425,642,074</u>	 <u>391,305,698</u>
 Total liabilities	 <u><u>\$ 16,689,498,454</u></u>	 <u><u>\$ 16,266,003,952</u></u>



**VALUATION BALANCE SHEET  
INSURANCE BENEFITS  
NON-HAZARDOUS CERS MEMBERS**

	June 30, 2016	June 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 2,079,811,055	\$ 1,997,456,463
Prospective contributions		
Member contributions	\$ 79,502,725	\$ 72,682,694
Employer normal contributions	441,835,902	477,798,719
Unfunded accrued liability contributions	<u>908,310,062</u>	<u>910,370,977</u>
Total prospective contributions	<u>\$ 1,429,648,689</u>	<u>\$ 1,460,852,390</u>
Total assets	<u><u>\$ 3,509,459,744</u></u>	<u><u>\$ 3,458,308,853</u></u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 1,326,304,614	\$ 1,215,933,830
Present value of benefits payable on account of active members	2,024,522,896	2,085,712,217
Present value of benefits payable on account of inactive members	<u>158,632,234</u>	<u>156,662,806</u>
Total liabilities	<u><u>\$ 3,509,459,744</u></u>	<u><u>\$ 3,458,308,853</u></u>



**VALUATION BALANCE SHEET  
INSURANCE BENEFITS  
HAZARDOUS CERS MEMBERS**

	June 30, 2016	June 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 1,135,784,220	\$ 1,087,707,118
Prospective contributions		
Member contributions	\$ 13,096,116	\$ 11,997,640
Employer normal contributions	124,880,681	141,433,960
Unfunded accrued liability contributions	<u>423,033,984</u>	<u>416,308,115</u>
Total prospective contributions	<u>\$ 561,010,781</u>	<u>\$ 569,739,715</u>
Total assets	<u>\$ 1,696,795,001</u>	<u>\$ 1,657,446,833</u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 855,273,445	\$ 770,542,575
Present value of benefits payable on account of active members	817,434,931	866,733,067
Present value of benefits payable on account of inactive members	<u>24,086,625</u>	<u>20,171,191</u>
Total liabilities	<u>\$ 1,696,795,001</u>	<u>\$ 1,657,446,833</u>



**VALUATION BALANCE SHEET  
INSURANCE BENEFITS  
TOTAL CERS MEMBERS**

	June 30, 2016	June 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 3,215,595,275	\$ 3,085,163,581
Prospective contributions		
Member contributions	\$ 92,598,841	\$ 84,680,334
Employer normal contributions	566,716,583	619,232,679
Unfunded accrued liability contributions	<u>1,331,344,046</u>	<u>1,326,679,092</u>
Total prospective contributions	<u>\$ 1,990,659,470</u>	<u>\$ 2,030,592,105</u>
Total assets	<u><u>\$ 5,206,254,745</u></u>	<u><u>\$ 5,115,755,686</u></u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 2,181,578,059	\$ 1,986,476,405
Present value of benefits payable on account of active members	2,841,957,827	2,952,445,284
Present value of benefits payable on account of inactive members	<u>182,718,859</u>	<u>176,833,997</u>
Total liabilities	<u><u>\$ 5,206,254,745</u></u>	<u><u>\$ 5,115,755,686</u></u>



The following tables provide the solvency test for non-hazardous and hazardous CERS members.

**Solvency Test  
Retirement Benefits  
Non-Hazardous CERS Members**

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Reported Asset		
	(1)	(2)	(3)	Actuarial Value of Assets	(1)	(2)	(3)
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed Portion)				
6/30/2011	\$ 1,110,967,160	\$ 5,209,783,924	\$ 2,597,333,941	\$ 5,629,611,183	100.0%	86.7%	0.0%
6/30/2012	1,117,549,337	5,416,932,995	2,605,085,363	5,547,235,599	100.0	81.8	0.0
6/30/2013	1,149,610,832	5,638,370,836	2,590,894,446	5,637,094,483	100.0	79.6	0.0
6/30/2014	1,204,383,085	5,873,279,494	2,694,860,037	6,117,133,692	100.0	83.6	0.0
6/30/2015	1,216,584,592	6,489,862,734	3,033,878,095	6,474,848,513	100.0	81.0	0.0
6/30/2016	1,231,027,269	6,785,529,719	3,059,899,806	6,535,372,347	100.0	78.2	0.0

**Solvency Test  
Retirement Benefits  
Hazardous CERS Members**

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Reported Asset		
	(1)	(2)	(3)	Actuarial Value of Assets	(1)	(2)	(3)
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed Portion)				
6/30/2011	\$ 382,072,055	\$ 1,768,511,545	\$ 708,457,452	\$ 1,779,545,393	100.0%	79.0%	0.0%
6/30/2012	381,672,428	1,889,884,303	738,435,316	1,747,379,297	100.0	72.3	0.0
6/30/2013	390,471,059	1,988,029,963	745,704,571	1,801,691,410	100.0	71.0	0.0
6/30/2014	415,069,629	2,077,516,709	796,239,415	1,967,640,027	100.0	74.7	0.0
6/30/2015	422,358,688	2,297,703,167	893,245,692	2,096,782,956	100.0	72.9	0.0
6/30/2016	428,713,398	2,388,711,595	887,031,230	2,139,119,173	100.0	71.6	0.0



**Solvency Test  
Insurance Benefits  
Non-Hazardous CERS Members**

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Reported Asset		
	(1)	(2)	(3)			(1)	(2)	(3)
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed Portion)					
6/30/2011	\$ 0	\$ 1,460,808,255	\$ 1,613,164,950	\$ 1,433,450,793	100.0%	98.1%	0.0%	
6/30/2012	0	1,146,907,750	1,223,863,538	1,512,853,851	100.0	100.0	29.9	
6/30/2013	0	1,205,599,287	1,238,294,813	1,628,244,197	100.0	100.0	34.1	
6/30/2014	0	1,318,182,882	1,298,731,718	1,831,199,465	100.0	100.0	39.5	
6/30/2015	0	1,372,596,636	1,535,230,804	1,997,456,463	100.0	100.0	40.7	
6/30/2016	0	1,484,936,848	1,503,184,269	2,079,811,055	100.0	100.0	39.6	

**Solvency Test  
Insurance Benefits  
Hazardous CERS Members**

Valuation Date	Aggregate Accrued Liabilities For				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Reported Asset		
	(1)	(2)	(3)			(1)	(2)	(3)
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed Portion)					
6/30/2011	\$ 0	\$ 771,631,287	\$ 876,071,468	\$ 770,790,274	100.0%	99.9%	0.0%	
6/30/2012	0	575,099,089	789,743,968	829,040,842	100.0	100.0	32.2	
6/30/2013	0	660,955,331	776,377,486	892,774,391	100.0	100.0	29.9	
6/30/2014	0	700,311,599	793,552,780	997,733,237	100.0	100.0	37.5	
6/30/2015	0	790,713,766	713,301,467	1,087,707,118	100.0	100.0	41.6	
6/30/2016	0	879,360,070	679,458,134	1,135,784,220	100.0	100.0	37.7	



**SCHEDULE B**  
**Development of Actuarial Value of Assets**  
**Retirement Benefits**  
**Non-Hazardous Members**

Valuation date June 30:	2015	2016	2017	2018	2019	2020
A. Actuarial Value Beginning of Year	\$ 6,117,133,692	\$ 6,474,848,513				
B. Market Value End of Year	6,416,853,506	6,106,186,908				
C. Market Value Beginning of Year	6,507,300,157	6,416,853,506				
D. Cash Flow						
D1. Contributions	446,166,560	418,092,469				
D2. Benefit Payments	(628,858,436)	(665,000,144)				
D3. Administrative Expenses	(18,212,642)	(19,385,046)				
D4. Investment Expenses	<u>(44,163,869)</u>	<u>(49,107,252)</u>				
D5. Net	(245,068,387)	(315,399,973)				
E. Investment Income						
E1. Market Total: B.-C.-D5.	154,621,736	4,733,375				
E2. Assumed Rate	7.75%	7.50%				
E3. Amount for Immediate Recognition	540,694,581	520,385,288				
E4. Amount for Phased-In Recognition	(386,072,845)	(515,651,913)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20*E4.	(77,214,569)	(103,130,383)	0	0	0	0
F2. First Prior Year	90,813,474	(77,214,569)	(103,130,383)	0	0	0
F3. Second Prior Year	33,352,842	90,813,474	(77,214,569)	(103,130,383)	0	0
F4. Third Prior Year	(88,282,845)	33,352,842	90,813,474	(77,214,569)	(103,130,383)	0
F5. Fourth Prior Year	<u>103,419,725</u>	<u>(88,282,845)</u>	<u>33,352,842</u>	<u>90,813,474</u>	<u>(77,214,569)</u>	<u>(103,130,383)</u>
F6. Total Recognized Investment Gain	62,088,627	(144,461,481)	(56,178,636)	(89,531,478)	(180,344,952)	(103,130,383)
G. Actuarial Value End of Year:						
A.+D5.+E3.+F6.	\$ 6,474,848,513	\$ 6,535,372,347				
H. Difference Between Market & Actuarial Values	\$ (57,995,007)	\$ (429,185,439)	\$ (373,006,803)	\$ (283,475,325)	\$ (103,130,383)	\$ 0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.



**Development of Actuarial Value of Assets  
Retirement Benefits  
Hazardous Members**

Valuation date June 30:	2015	2016	2017	2018	2019	2020
A. Actuarial Value Beginning of Year	\$ 1,967,640,027	\$ 2,096,782,956				
B. Market Value End of Year	2,073,397,045	2,003,669,273				
C. Market Value Beginning of Year	2,082,998,414	2,073,397,045				
D. Cash Flow						
D1. Contributions	157,861,279	157,267,090				
D2. Benefit Payments	(203,244,240)	(216,327,237)				
D3. Administrative Expenses	(1,287,827)	(1,366,150)				
D4. Investment Expenses	<u>(14,240,230)</u>	<u>(16,500,706)</u>				
D5. Net	(60,911,018)	(76,927,003)				
E. Investment Income						
E1. Market Total: B.-C.-D5.	51,309,649	7,199,231				
E2. Assumed Rate	7.75%	7.50%				
E3. Amount for Immediate Recognition	173,864,114	169,739,498				
E4. Amount for Phased-In Recognition	(122,554,465)	(162,540,267)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20*E4.	(24,510,893)	(32,508,053)	0	0	0	0
F2. First Prior Year	29,602,879	(24,510,893)	(32,508,053)	0	0	0
F3. Second Prior Year	8,909,239	29,602,879	(24,510,893)	(32,508,053)	0	0
F4. Third Prior Year	(31,969,450)	8,909,239	29,602,879	(24,510,893)	(32,508,053)	0
F5. Fourth Prior Year	<u>34,158,058</u>	<u>(31,969,450)</u>	<u>8,909,239</u>	<u>29,602,879</u>	<u>(24,510,893)</u>	<u>(32,508,053)</u>
F6. Total Recognized Investment Gain	16,189,833	(50,476,278)	(18,506,828)	(27,416,067)	(57,018,946)	(32,508,053)
G. Actuarial Value End of Year:						
A.+D5.+E3.+F6.	\$ 2,096,782,956	\$ 2,139,119,173				
H. Difference Between Market & Actuarial Values	\$ (23,385,911)	\$ (135,449,900)	\$ (116,943,072)	\$ (89,527,005)	\$ (32,508,053)	\$ 0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.



**Development of Actuarial Value of Assets  
Insurance Benefits  
Non-Hazardous Members**

Valuation date June 30:	2015	2016	2017	2018	2019	2020
A. Actuarial Value Beginning of Year	\$ 1,831,199,465	\$ 1,997,456,463				
B. Market Value End of Year	1,948,454,097	1,943,756,727				
C. Market Value Beginning of Year	1,899,557,376	1,948,454,097				
D. Cash Flow						
D1. Contributions	126,700,611	120,152,124				
D2. Benefit Payments	(113,734,556)	(122,713,277)				
D3. Administrative Expenses	(787,341)	(725,979)				
D4. Investment Expenses	<u>(13,082,126)</u>	<u>(16,592,147)</u>				
D5. Net	(903,412)	(19,879,279)				
E. Investment Income						
E1. Market Total: B.-C.-D5.	49,800,133	15,181,909				
E2. Assumed Rate	7.75%	7.50%				
E3. Amount for Immediate Recognition	160,769,748	162,602,937				
E4. Amount for Phased-In Recognition	(110,969,615)	(147,421,028)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20*E4.	(22,193,923)	(29,484,206)	0	0	0	0
F2. First Prior Year	20,883,931	(22,193,923)	(29,484,206)	0	0	0
F3. Second Prior Year	6,696,406	20,883,931	(22,193,923)	(29,484,206)	0	0
F4. Third Prior Year	(36,271,274)	6,696,406	20,883,931	(22,193,923)	(29,484,206)	0
F5. Fourth Prior Year	<u>37,275,522</u>	<u>(36,271,274)</u>	<u>6,696,403</u>	<u>20,883,931</u>	<u>(22,193,923)</u>	<u>(29,484,206)</u>
F6. Total Recognized Investment Gain	6,390,662	(60,369,066)	(24,097,795)	(30,794,198)	(51,678,129)	(29,484,206)
G. Actuarial Value End of Year:						
A.+D5.+E3.+F6.	\$ 1,997,456,463	\$ 2,079,811,055				
H. Difference Between Market & Actuarial Values	\$ (49,002,366)	\$ (136,054,328)	\$ (111,956,533)	\$ (81,162,335)	\$ (29,484,206)	\$ 0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.



**Development of Actuarial Value of Assets  
Insurance Benefits  
Hazardous Members**

Valuation date June 30:	2015	2016	2017	2018	2019	2020
A. Actuarial Value Beginning of Year	\$ 997,733,237	\$ 1,087,707,118				
B. Market Value End of Year	1,061,560,788	1,062,602,089				
C. Market Value Beginning of Year	1,034,307,636	1,061,560,788				
D. Cash Flow						
D1. Contributions	72,870,851	68,931,562				
D2. Benefit Payments	(65,555,654)	(68,655,395)				
D3. Administrative Expenses	(339,023)	(342,648)				
D4. Investment Expenses	<u>(7,175,588)</u>	<u>(9,287,179)</u>				
D5. Net	(199,414)	(9,353,660)				
E. Investment Income						
E1. Market Total: B.-C.-D5.	27,452,566	10,394,961				
E2. Assumed Rate	7.75%	7.50%				
E3. Amount for Immediate Recognition	87,604,757	88,901,745				
E4. Amount for Phased-In Recognition	(60,152,191)	(78,506,784)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20*E4.	(12,030,438)	(15,701,357)	0	0	0	0
F2. First Prior Year	11,080,227	(12,030,438)	(15,701,357)	0	0	0
F3. Second Prior Year	3,554,157	11,080,227	(12,030,438)	(15,701,357)	0	0
F4. Third Prior Year	(18,373,572)	3,554,157	11,080,227	(12,030,438)	(15,701,357)	0
F5. Fourth Prior Year	<u>18,338,164</u>	<u>(18,373,572)</u>	<u>3,554,157</u>	<u>11,080,227</u>	<u>(12,030,438)</u>	<u>(15,701,357)</u>
F6. Total Recognized Investment Gain	2,568,538	(31,470,983)	(13,097,411)	(16,651,568)	(27,731,795)	(15,701,357)
G. Actuarial Value End of Year:						
A.+D5.+E3.+F6.	\$ 1,087,707,118	\$ 1,135,784,220				
H. Difference Between Market & Actuarial Values	\$ (26,146,330)	\$ (73,182,131)	\$ (60,084,720)	\$ (43,433,152)	\$ (15,701,357)	\$ 0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.



**SCHEDULE C**

**STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS**

The assumptions and methods used in the valuation were based on the actuarial experience study for the five-year period ending June 30, 2013, submitted April 30, 2014, and adopted by the Board on December 4, 2014.

INVESTMENT RATE OF RETURN: 7.50% per annum, compounded annually for retirement and insurance benefits.

PRICE INFLATION: 3.25% per annum, compounded annually.

PAYROLL GROWTH: 4.00% per annum, compounded annually.

SALARY INCREASES: The assumed annual rates of future salary increases for both non-hazardous and hazardous members are as follows and include inflation at 4.00% per annum:

Service Years	Annual Rates of Salary Increases				
	Merit & Seniority		Base (Economy)	Increase Next Year	
	Non-Hazardous	Hazardous		Non-Hazardous	Hazardous
0-1	8.17%	14.90%	4.00%	12.50%	19.50%
1-2	4.81%	5.77%	4.00%	9.00%	10.00%
2-3	1.44%	1.92%	4.00%	5.50%	6.00%
3-4	1.44%	1.20%	4.00%	5.50%	5.25%
4-5	0.96%	0.96%	4.00%	5.00%	5.00%
5-6	0.96%	0.48%	4.00%	5.00%	4.50%
6-7	0.72%	0.00%	4.00%	4.75%	4.00%
7-8	0.72%	0.00%	4.00%	4.75%	4.00%
8-9	0.48%	0.00%	4.00%	4.50%	4.00%
9-10	0.48%	0.00%	4.00%	4.50%	4.00%
10 & Over	0.24%	0.00%	4.00%	4.25%	4.00%

DISABILITY: Representative assumed annual rates of disability for both non-hazardous and hazardous members are as follows:

Nearest Age	Annual Rates of Disability			
	Non-Hazardous		Hazardous	
	Male	Female	Male	Female
20	0.02%	0.02%	0.05%	0.05%
30	0.03%	0.03%	0.09%	0.09%
40	0.07%	0.07%	0.20%	0.20%
50	0.19%	0.19%	0.56%	0.56%
60	0.49%	0.49%	1.46%	1.46%



RETIREMENT: The assumed annual rates of retirement for both non-hazardous and hazardous members are as follows:

Annual Rates of Retirement					
Non-Hazardous			Hazardous		
Age	Those Eligible for Service Retirement*	Those Eligible for Service Retirement**	Service	Those Eligible for Service Retirement*	Those Eligible for Service Retirement**
55	5.0%		20	22.5%	
56	6.0%		21	22.5%	
57	7.0%		22	22.5%	
58	7.0%		23	22.5%	
59	8.0%		24	30.0%	
60	9.0%	9.0%	25	33.0%	22.5%
61	15.0%	15.0%	26	33.0%	22.5%
62	18.0%	18.0%	27	36.0%	22.5%
63	18.0%	18.0%	28	39.0%	22.5%
64	18.0%	18.0%	29	55.0%	30.0%
65	18.0%	18.0%	30	33.0%	33.0%
66	18.0%	18.0%	31	33.0%	33.0%
67	18.0%	18.0%	32	50.0%	36.0%
68	18.0%	18.0%	33	40.0%	39.0%
69	18.0%	18.0%	34	40.0%	55.0%
70	18.0%	18.0%	35	40.0%	33.0%
71	18.0%	18.0%	36	40.0%	33.0%
72	18.0%	18.0%	37	40.0%	50.0%
73	18.0%	18.0%	38	40.0%	40.0%
74	18.0%	18.0%	39	40.0%	40.0%
75	100.0%	100.0%	40	40.0%	40.0%

\* For members participating before September 1, 2008. If service is at least 27 years, the rate is 30%.

\*\* For members participating on or after September 1, 2008. If age plus service is at least 87, the rate is 30%.

+ For members participating before September 1, 2008. The annual rate of service retirement is 100% at age 62.

++ For members participating on or after September 1, 2008. The annual rate of service retirement is 100% at age 60.



**WITHDRAWAL:** The assumed annual rates of withdrawal for both non-hazardous and hazardous members are as follows:

Service Years	Annual Rates of Withdrawal	
	Non-Hazardous	Hazardous
0-1	28.00%	20.50%
1-2	16.00%	13.00%
2-3	12.00%	10.50%
3-4	10.00%	9.00%
4-5	8.00%	8.00%
5-6	6.00%	7.00%
6-7	5.00%	7.00%
7-8	5.00%	6.00%
8-13	4.00%	6.00%
14 & Over	3.00%	6.00%

**DEATH BEFORE RETIREMENT:** The rates of mortality for the period before retirement are according to the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (multiplied by 50% for males and 30% for females).

**DEATH AFTER RETIREMENT:** The rates of mortality for the period after service retirement are according to the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (set back 1 year for females) for all healthy retired members and beneficiaries. The RP-2000 Combined Disabled Mortality Table projected with Scale BB to 2013 (set back 4 years for males) is used for the period after disability retirement. These assumptions are used to measure the probabilities of each benefit payment being made after retirement. These assumptions contain margin for mortality improvements.

**PERCENT MARRIED:** 100% of employees are assumed to be married, with the wife 3 years younger than the husband.

**DEPENDENT CHILDREN:** For hazardous members' duty-related death benefits, it is assumed that the member is survived by two dependent children each age 6.

**FORM OF PAYMENT:** Participants are assumed to elect a life-only form of payment.

**ASSET VALUATION METHOD:** Five-year market related actuarial value, as developed in Schedule B. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected actuarial value of assets, based on the ultimate assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected actuarial value.



**ACTUARIAL COST METHOD:** Costs were determined using the Entry Age Normal, Level Percentage of Pay Actuarial Cost Method. Under this method, a calculation is made for retirement benefits to determine the uniform and constant percentage rate of contribution which, if applied to the compensation of the average new member during the entire period of his or her anticipated covered service, would be required to meet the cost of benefits payable. Actuarial gains and losses are reflected in the unfunded actuarial accrued liability.

**MULTIPLE STATUS/MULTIPLE SYSTEM MEMBERS:** Some members may be represented under more than one retirement system and/or may have more than one status (e.g., active in one system, deferred vested in another and retired from a different system). For pension purposes, members that are active in one System but have service in another are assumed to retire from the System in which they are currently active. Any deferred pension benefits from another System are assumed to begin once the member terminates from their current active position. The insurance liabilities for multiple status/multiple system members are calculated assuming only one benefit is payable across all Systems and that benefit is payable from the combination of status and System which produces the highest economic value to the member.

**AFFORDABLE CARE ACT (ACA):** The impact of the Affordable Care Act (ACA) was addressed in this valuation. Review of the information currently available did not identify any specific provisions of the ACA that are anticipated to significantly impact results. While the impact of certain provisions such as the excise tax on high-value health insurance plans beginning in 2018 (if applicable), mandated benefits and participation changes due to the individual mandate should be recognized in the determination of liabilities, overall future plan costs and the resulting liabilities are driven by the assumed rate of health care inflation (i.e., trend). The trend assumption forecasts the anticipated increase to initial per capita costs, taking into account health care cost inflation, increases in benefit utilization, government-mandated benefits, and technological advances. Given the uncertainty regarding the ACA's implementation (e.g., the impact of excise tax on high-value health insurance plans, changes in participation resulting from the implementation of state-based health insurance exchanges), continued monitoring of the ACA's impact on the insurance liability will be required.

**HEALTH CARE BENEFITS VALUED:** Medical and drug benefits for retirees under age 65 and Medicare eligible.

**HEALTH CARE SPOUSE AGE DIFFERENCE:** Wives are assumed to be three years younger than husbands.

**HEALTH CARE COST TREND RATES:** Following is a chart detailing trend assumptions.

Year	Annual Rate of Increase		
	Under Age 65	Age 65 & Older	Dollar Contribution*
2016	7.50%	5.50%	1.50%
2017	6.75%	5.25%	1.50%
2018	6.25%	5.00%	1.50%
2019	5.75%	5.00%	1.50%
2020	5.25%	5.00%	1.50%
2021 & Beyond	5.00%	5.00%	1.50%

\* Applies to members participating on or after July 1, 2003



HEALTH CARE AGE RELATED MORBIDITY: For retirees ages 65 and older, per capita health care costs are adjusted to reflect expected health care cost changes related to age. The increase to the net incurred claims was assumed to be:

Participant Age	Annual Increase
65 – 69	3.00%
70 – 74	2.50%
75 – 79	2.00%
80 – 84	1.00%
85 – 89	0.50%
90 & Beyond	0.00%

Please note that for the retiree health care liabilities of those under age 65, the current premium charged by the Kentucky Employees' Health Plan (KEHP) is used as the base cost and is projected forward using the health care trend assumption. No implicit rate subsidy is calculated or recognized as the implicit rate subsidy is deemed the responsibility of the KEHP. Under Actuarial Standard of Practice No. 6 (ASOP No. 6), aging subsidies (or implicit rate subsidies) should be recognized, as the differences in health care utilization and cost due to age have been demonstrated and well quantified. The impact of aging on a valuation's results can be as significant as the use of mortality, trend, and discounting. It has been the long-standing position that the responsibility for compliance with GASB Statement No. 43, when it relates to KEHP implicit subsidies, rests with KEHP, not KRS, as KRS has no operational authority over KEHP. As such, KEHP implicit subsidies are excluded from the OPEB valuation process of the Retiree Medical Plan. As GASB 74 and 75 prohibit such a deviation from ASOP No. 6, additional consideration to the current treatment of KEHP implicit rate subsidies may be needed in the future. The estimated impact of KEHP implicit subsidies to the actuarial accrued liability is an increase of \$380,865,151 for CERS non-hazardous and \$193,213,657 for CERS hazardous.

HEALTH CARE DEFERRED VESTED BENEFIT RECIPIENT INITIAL AGE OF BENEFIT RECEIPT FOR MEMBERS: Health care benefits are assumed to begin at the following ages for deferred vested benefit recipients:

Deferred Vested Initial Age of Benefit Receipt		
Applies Only to Members with Non-Hazardous Service		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
55	55	60

Deferred Vested Initial Age of Benefit Receipt		
Applies Only to Members with Hazardous Service		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
50	50	50



HEALTH CARE ANTICIPATED PLAN PARTICIPATION: Representative values of the assumed annual rates of member participation and spouse coverage are as follows:

Plan Elections of Covered Members Age 65 and Older as of January 1, 2017		
Kentucky Retirement System Health Plan	Non-Hazardous	Hazardous
Medical Only	7.62%	4.08%
Essential	8.01%	4.64%
Premium	84.37%	91.28%

Retirement Participation Rates			
Service at Retirement	Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
Under 10	50.00%	100.00%	100.00%
10 – 14	75.00%	100.00%	100.00%
15 – 19	90.00%	100.00%	100.00%
20+	100.00%	100.00%	100.00%

Disability/Death Participation Rates	
Members Participating Before July 1, 2003	
Duty-Disability	Duty Death-In-Service
100.00%	100.00%

Deferred Vested Member Participation Rates		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
50.00%	100.00%	100.00%

Members Electing Spouse Coverage		
Applies Only to Members with Hazardous Service		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
75.00%	75.00%	75.00%



HEALTH CARE MONTHLY PLAN COSTS: Assumed per capita health care costs were based on past experience and trended based on the assumptions. Following are charts detailing retiree per capita assumptions for the year following the valuation date. The amounts include medical and drug costs. Members under 65 are assumed to elect the LivingWell PPO. For retirees ages 65 and older, the full costs shown are before averaging. The average costs are then normalized to age 65 and age adjusted in calculating liabilities. The dollar amount contribution level is the cost to the system per year of service for members participating on or after July 1, 2003.

<b>Under Age 65 (KEHP) Full Costs as of January 1, 2017</b>				
<b>Tier Elected</b>	<b>LivingWell CDHP</b>	<b>LivingWell PPO</b>	<b>Standard PPO</b>	<b>Standard CDHP</b>
Single	\$ 702.10	\$ 721.14	\$ 678.22	\$ 663.80
Parent Plus	967.18	1,023.04	964.58	930.94
Couple	1,302.74	1,564.20	1,477.72	1,431.76
Family	1,453.94	1,738.40	1,640.22	1,594.52
Family C-R	810.00	865.64	815.50	793.18

<b>Age 65 and Older Full Costs as of January 1, 2016</b>	
Kentucky Retirement System Health Plan - Medical Only	\$162.47
Kentucky Retirement System Health Plan - Essential	77.76
Kentucky Retirement System Health Plan - Premium	252.51

<b>Age 65 and Older Average Cost as of the Valuation Date Based on Actual Retiree Elections</b>	
<b>Non-Hazardous</b>	<b>Hazardous</b>
\$225.54	\$234.37

<b>Dollar Amount Contribution Level Per Year of Service as of July 1, 2015 Applies to members participating on or after July 1, 2003</b>	
<b>Non-Hazardous</b>	<b>Hazardous</b>
\$12.99	\$19.48



## SCHEDULE D

### SUMMARY OF MAIN BENEFIT AND CONTRIBUTION PROVISIONS

This schedule summarizes the major retirement benefit provisions of CERS included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

**Plan Year:** July 1 through June 30

**Non-Hazardous Normal Retirement:**

*Members whose participation began before 8/1/2004*

<i>Age Requirement</i>	65
<i>Service Requirement</i>	At least one month of non-hazardous duty service credit
<i>Amount</i>	<p>If a member has at least 48 months of service, the monthly benefit is 2.20% multiplied by final average compensation, multiplied by years of service.</p> <p>Final compensation is calculated by taking the average of the highest five (5) fiscal years of salary. If the number of months of service credit during the five (5) year period is less than forty-eight (48), one (1) or more additional fiscal years shall be used.</p> <p>If a member has less than 48 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.</p>

*Members whose participation began on or after 8/1/2004, but before 9/1/2008*

<i>Age Requirement</i>	65
<i>Service Requirement</i>	At least one month of non-hazardous duty service credit
<i>Amount</i>	<p>If a member has at least 48 months of service, the monthly benefit is 2.00% multiplied by final average compensation, multiplied by years of service.</p> <p>Final compensation is calculated by taking the average of the highest five (5) fiscal years of salary. If the number of months of service credit during the five (5) year period is less than forty-eight (48), one (1) or more additional fiscal years shall be used.</p> <p>If a member has less than 48 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.</p>



**Non-Hazardous Normal Retirement (continued):**

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

*Requirement*

Age 65 with 60 months of non-hazardous duty service credit, or age 57 if age plus service equals at least 87.

*Amount*

The monthly benefit is the following benefit factor based on service credit at retirement plus 2.00% for each year of service greater than 30 years, multiplied by final average compensation, multiplied by years of service.

Service Credit	Benefit Factor
10 years or less	1.10%
10+ – 20 years	1.30%
20+ – 26 years	1.50%
26+ – 30 years	1.75%

Final compensation is calculated by taking the average of the last (not highest) five (5) complete fiscal years of salary. Each fiscal year used to determine final compensation must contain twelve (12) months of service credit.

If a member has less than 60 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.

*Members whose participation began on or after 1/1/2014*

*Requirement*

Age 65 with 60 months of non-hazardous duty service credit, or age 57 if age plus service equals at least 87.

*Amount*

Each year that a member is an active contributing member to the System, the member and the member's employer will contribute 5.00% and 4.00% of creditable compensation respectively into a hypothetical account. This hypothetical account will earn interest annually on both the member's and employer's contribution at a minimum rate of 4%. If the System's geometric average net investment return for the previous five years exceeds 4%, then the hypothetical account will be credited with an additional amount of interest equal to 75% of the amount of the return which exceeds 4%. All interest credits will be applied to the hypothetical account balance on June 30 based on the account balance as of June 30 of the previous year.

Upon retirement the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or annuitized into a single life annuity option.



**Hazardous Normal Retirement:**

*Members whose participation began before 9/1/2008*

- Age Requirement* 55
- Service Requirement* At least one month of hazardous duty service credit
- Amount* If a member has at least 60 months of service, the monthly benefit is 2.50% multiplied by final average compensation, multiplied by years of service.  
  
Final compensation is calculated by taking the average of the highest three (3) fiscal years of salary. If the number of months of service credit during the three (3) year period is less than twenty-four (24), one (1) or more additional fiscal years shall be used.  
  
If a member has less than 60 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

- Age Requirement* 60
- Service Requirement* At least 60 months of hazardous duty service credit
- Amount* The monthly benefit is the following benefit factor based on service credit at retirement, multiplied by final average compensation, multiplied by years of service.

Service Credit	Benefit Factor
10 years or less	1.30%
10+ – 20 years	1.50%
20+ – 25 years	2.25%
25+ years	2.50%

Final compensation is calculated by taking the average of the highest three (3) complete fiscal years of salary. Each fiscal year used to determine final compensation must contain twelve (12) months of service credit.

If a member has less than 60 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.



**Hazardous Normal Retirement (continued):**

*Members whose participation began on or after 1/1/2014*

<i>Age Requirement</i>	60
<i>Service Requirement</i>	At least 60 months of hazardous duty service credit or 25 or more years of service, with no age requirement
<i>Amount</i>	<p>Each year that a member is an active contributing member to the System, the member and the member's employer will contribute 8.00% and 7.50% of creditable compensation respectively into a hypothetical account. This hypothetical account will earn interest annually on both the member's and employer's contribution at a minimum rate of 4%. If the System's geometric average net investment return for the previous five years exceeds 4%, then the hypothetical account will be credited with an additional amount of interest equal to 75% of the amount of the return which exceeds 4%. All interest credits will be applied to the hypothetical account balance on June 30 based on the account balance as of June 30 of the previous year.</p> <p>Upon retirement the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or annuitized into a single life annuity option.</p>

**Non-Hazardous Early Retirement:**

*Members whose participation began before 9/1/2008*

<i>Requirement</i>	Age 55 with 60 months of service or any age with 25 years of service.
<i>Amount</i>	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 65 or has less than 27 years of service, whichever is smaller.



**Non-Hazardous Early Retirement (continued):**

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

<i>Requirement</i>	Age 60 with 10 years of service.
<i>Amount</i>	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 65, or does not meet the rule of 87 (age plus service) and is younger than age 57, whichever is smaller.

**Hazardous Early Retirement:**

*Members whose participation began before 9/1/2008*

<i>Requirement</i>	Age 50 with 15 years of service or any age with 20 years of service.
<i>Amount</i>	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 55 or has less than 20 years of service, whichever is smaller.

**Hazardous Early Retirement:**

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

<i>Requirement</i>	Age 50 with 15 years of service or any age with 25 years of service.
<i>Amount</i>	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 60 or has less than 25 years of service, whichever is smaller.

**Non-Hazardous Disability:**

<i>Age Requirement</i>	None
<i>Service Requirement</i>	60 months

*Members whose participation began before 8/1/2004*

Normal retirement benefit except that service credit will be added to total service for the period from the last day of plan employment to the member's 65th birthday or until the combined total service as of the last day of paid employment and added service equals 25 years. The total amount of service credit added shall not exceed the member's actual service credit on the last day of paid employment. For members with at least 25 years of service but less than 27 years of service, total service shall be 27 years. For employees with 27 or more years of service credit, actual service will be used.



**Non-Hazardous Disability (continued):**

A contributing member in a non-hazardous position who is disabled in the line of duty is entitled to a retirement benefit of not less than 25% of the member's final monthly rate of pay plus 10% of the member's final monthly rate of pay for each dependent child. The maximum dependent child's benefit is 40% of the member's final monthly rate of pay.

*Members whose participation began on or after 8/1/2004 but before 1/1/2014*

Normal retirement benefit based on actual service with no penalty or, if larger, 20% of the Final Rate of Pay. May apply for disability even after normal retirement age.

*Members whose participation began on or after 1/1/2014*

The hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or an annuity equal to the larger of 20% of the member's monthly final rate of pay or the annuitized hypothetical account into a single life annuity option.

**Hazardous Disability:**

*Age Requirement*

None

*Service Requirement*

60 months (waived if in line of duty disability)

*Members whose participation began before 8/1/2004*

Normal retirement benefit except if the member's total service credit is less than 20 years, service credit will be added for the period from the last day of paid employment to the member's 55th birthday.

The maximum service credit added will not exceed the total service the member had on this last day of paid employment and the maximum service credit for calculating his retirement allowance, including total service and service added will not exceed 20 years. May not apply if eligible for an unreduced retirement allowance.

A member in a hazardous position who is disabled in the line of duty is entitled to the normal retirement benefit based on years of service and final compensation determined as of the date of disability (no penalty), except that the monthly retirement allowance payable shall not be less than 25% of the member's monthly final monthly rate of pay. Each dependent child shall receive 10% of the disabled member's monthly final rate of pay; however the total maximum dependent children's benefit shall not exceed 40% of the member's monthly final rate of pay.



**Hazardous Disability (continued):**

*Members whose participation began on or after 8/1/2004 but before 1/1/2014*

Normal retirement benefit based on years of service and final compensation determined as of the date of disability (no penalty) or, if larger, 25% of the member's monthly final rate of pay. May apply for disability even after normal retirement age.

*Members whose participation began on or after 1/1/2014*

The hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or an annuity equal to the larger of 25% of the member's monthly final rate of pay or the annuitized hypothetical account into a single life annuity option.

**Vesting:**

*Members whose participation began before 9/1/2008*

*Age Requirement*

None

*Service Requirement*

60 months. Service purchased after August 1, 2004 does not count toward vesting insurance benefits. Service purchased by employees who began participating on or after August 1, 2004 does not count toward vesting retirement benefits. Recontribution of refunds and omitted service purchases are the exception to this rule for service requirement.

*Amount*

Normal retirement benefit deferred to normal retirement age or reduced benefit payable at early retirement age.

*Normal Retirement Age*

65 for non-hazardous members and 55 for hazardous members.

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

*Age Requirement*

None

*Service Requirement*

60 months. Service purchased after August 1, 2004 does not count toward vesting insurance benefits.

Service purchased by employees who began participating on or after August 1, 2004 does not count toward vesting retirement benefits. Recontribution of refunds and omitted service purchases are the exception to this rule for service requirement.

*Amount*

Normal retirement benefit deferred to normal retirement age or reduced benefit payable at early retirement age.



**Vesting (continued):**

*Normal Retirement Age* 65 for non-hazardous members and 60 for hazardous members.

*Members whose participation began on or after 1/1/2014*

*Age Requirement* None

*Service Requirement* 60 months.

*Amount* Upon termination the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or the member can elect to leave the hypothetical account balance in the System. If the member does not withdraw the account balance, it will continue to earn 4% interest. Upon reaching normal retirement age the member can apply for retirement and receive the account balance as a lump sum payment or annuitize the account balance into a single life annuity.

**Pre-Retirement Death Benefit (not in line of duty):**

*Members whose participation began before 1/1/2014*

*Requirement* Eligible for Normal or Early Retirement, or any age in active employment with 60 months service, or any age and not in active employment with at least 144 months of service.

*Amount* Benefit equal to the benefit the member would have received had the member retired on the day before the date of death and elected a 100% joint and survivor form. Benefit is actuarially reduced if member is less than normal retirement age at the date of death.

*Members whose participation began on or after 1/1/2014*

*Requirement* 60 months service

*Amount* The maximum of the benefit equal to the benefit the member would have received had the member retired on the day before the date of death.



**Spouse's Pre-Retirement Death Benefit (in line of duty):**

<i>Requirement</i>	None
<i>Amount</i>	The spouse may choose (1) a \$10,000 lump sum payment and monthly payments of 25% of the member's final monthly rate of pay or (2) benefit options offered under death not in line of duty.

**Dependent Non-Spouse's Death Benefit (in line of duty) – Hazardous Plan:**

<i>Requirement</i>	None
<i>Amount</i>	The non-spouse may choose (1) a \$10,000 lump sum payment or (2) benefit options offered under death not in line of duty.

**Dependent Child's Death Benefit (in line of duty):**

<i>Requirement</i>	None
<i>Amount</i>	10% of member's final monthly rate of pay. Dependent child payments cannot exceed 40% of the member's monthly final rate of pay.

**Post-Retirement Death Benefit:**

<i>Requirement</i>	Retired member in receipt of monthly benefit based on at least 48 months or more of combined service with KERS, CERS or SPRS.
<i>Amount</i>	\$5,000

**Non-Hazardous Member Contributions:**

<i>Members whose participation began before 9/1/2008</i>	5% of all creditable compensation. Interest paid on the members' accounts is currently 2.5% shall not be less than 2.0%. Member entitled to a full refund of contributions with interest.
<i>Members whose participation began on or after 9/1/2008</i>	6% of all creditable compensation, with 5% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Interest paid on the members' accounts will be set at 2.5%. Member entitled to a full refund of contributions and interest in their individual account, however, the 1% contributed to the insurance fund is non-refundable.



**Non-Hazardous Member Contributions (continued):**

*Members whose participation began on or after 1/1/2014*

6% of all creditable compensation, with 5% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Member entitled to a full refund of contributions and interest on the member's portion of the hypothetical account, however, the 1% contributed to the insurance fund is non-refundable.

**Hazardous Member Contributions:**

*Members whose participation began before 9/1/2008*

8% of all creditable compensation. Interest paid on the members' accounts is currently 2.5% shall not be less than 2.0%. Member entitled to a full refund of contributions with interest.

*Members whose participation began on or after 9/1/2008*

9% of all creditable compensation, with 8% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Interest paid on the members' accounts will be set at 2.5%. Member entitled to a full refund of contributions and interest in their individual account, however, the 1% contributed to the insurance fund is non-refundable.

*Members whose participation began on or after 1/1/2014*

9% of all creditable compensation, with 8% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Member entitled to a full refund of contributions and interest on the member's portion of the hypothetical account, however, the 1% contributed to the insurance fund is non-refundable.



**Non-Hazardous Insurance Plan for Retirees:**

*Members whose participation began before 7/1/2003*

*Requirement*

In receipt of a monthly retirement allowance.

*Amount*

The Retirement System pays a portion of lifetime medical premiums for retirees based on the retired member's years of service credit. The percentage of the monthly contribution rate paid is show in the following table.

Service Credit	Percentage Paid*
0 – 3 years	0%
4 – 9 years	25%
10 – 14 years	50%
15 – 19 years	75%
20 or more years	100%

*\*100% of the monthly contribution is paid towards the health insurance for a retired member who is totally disabled from any employment as a result of a duty-related injury regardless of actual service. 100% of the monthly contribution is paid toward health insurance for the spouse and dependent children of a member who dies as a result of a duty related injury, regardless of the deceased member's service. The insurance benefit will be provided as long as the spouse and dependent children are eligible for a monthly retirement benefit.*

*Members whose participation began on or after 7/1/2003, but before 9/1/2008*

*Requirement*

Monthly retirement allowance with at least 120 months of service at retirement.

*Amount*

The Retirement System pays \$12.99 per month for each year of earned service for retirees. This amount is shown as of the valuation date and is increased annually 1.5%.

*Members whose participation began on or after 9/1/2008*

*Requirement*

Monthly retirement allowance with at least 180 months of service at retirement.

*Amount*

The Retirement System pays \$10 per month for each year of earned service for retirees. This amount will be increased annually by 1.5%.



**Hazardous Insurance Plan for Retirees:**

*Members whose participation began before 7/1/2003*

*Requirement*

In receipt of a monthly retirement allowance.

*Amount*

The Retirement System pays a portion of lifetime medical premiums for retirees, their spouse and their dependents based on the retired member's years of service credit. The percentage of the monthly contribution rate paid is show in the following table.

Service Credit	Percentage Paid*
0 – 3 years	0%
4 – 9 years	25%
10 – 14 years	50%
15 – 19 years	75%
20 or more years	100%

*\*100% of the monthly contribution is paid towards the health insurance for a member, member's spouse and dependents if the member is disabled in the line of duty as a result of a duty-related injury, regardless of actual service. 100% of the monthly contribution is paid toward health insurance for the spouse and dependent children of a member who dies in the line of duty regardless of the deceased member's service. The insurance benefit will be provided as long as the spouse and dependent children are eligible for a monthly retirement benefit.*

*Members whose participation began on or after 7/1/2003, but before 9/1/2008*

*Requirement*

Monthly retirement allowance with at least 120 months of service at retirement.

*Amount*

The Retirement System pays \$19.48 per month for each year of earned service for retirees. Upon the retiree's death, the surviving spouse will receive \$12.99 per month for each year of earned. These amounts are shown as of the valuation date and are increased annually by 1.5%.

*Members whose participation began on or after 9/1/2008*

*Requirement*

Monthly retirement allowance with at least 180 months of service at retirement.

*Amount*

The Retirement System pays \$19.48 per month for each year of earned service for retirees. Upon the retiree's death, the surviving spouse will receive \$12.99 per month for each year of earned. These amounts will be increased annually by 1.5%.



**SCHEDULE E**

**DETAILED TABULATIONS OF THE DATA**

**Schedule of Non-Hazardous Retired Members Added to and Removed From Rolls  
Last Six Fiscal Years**

<b>Year Ending June 30</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
			<b><u>Number</u></b>			
Beginning of Year	41,038	43,211	45,304	47,676	49,935	52,651
Added	3,250	3,300	3,570	3,480	4,020	4,409
Removed	1,077	1,207	1,198	1,221	1,304	721
End of Year	43,211	45,304	47,676	49,935	52,651	56,339
			<b><u>Annual Allowances*</u></b>			
Beginning of Year	\$ 452,613,550	\$ 483,594,068	\$ 515,008,361	\$ 557,979,192	\$ 582,957,825	\$ 617,550,927
Added	38,861,094	41,160,717	56,721,012	33,974,542	44,962,364	49,487,208
Removed	7,880,576	9,746,424	13,750,181	8,995,909	10,369,262	5,821,565
End of Year	\$ 483,594,068	\$ 515,008,361	\$ 557,979,192	\$ 582,957,825	\$ 617,550,927	\$ 661,216,570
% Increase in Allowances	6.84%	6.50%	8.34%	4.48%	5.93%	7.07%
Average Annual Allowance	\$ 11,191	\$ 11,368	\$ 11,704	\$ 11,674	\$ 11,729	\$ 11,736

\* The annual allowances shown for 2013 and later include allowances for hazardous members who are receiving a portion of benefit from the non-hazardous system.



**Schedule of Hazardous Retired Members Added to and Removed From Rolls  
Last Six Fiscal Years**

<b>Year Ending June 30</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
	<b><u>Number</u></b>					
Beginning of Year	6,068	6,468	6,878	7,293	7,646	8,034
Added	502	483	519	469	526	604
Removed	102	73	104	116	138	75
End of Year	6,468	6,878	7,293	7,646	8,034	8,563
	<b><u>Annual Allowances</u></b>					
Beginning of Year	\$ 146,916,812	\$ 160,259,395	\$ 173,221,483	\$ 182,634,895	\$ 191,007,832	\$ 202,153,338
Added	14,640,991	14,149,084	10,923,660	9,940,048	13,429,781	14,642,463
Removed	1,298,408	1,186,996	1,510,248	1,567,111	2,284,275	1,493,700
End of Year	\$ 160,259,395	\$ 173,221,483	\$ 182,634,895	\$ 191,007,832	\$ 202,153,338	\$ 215,302,101
% Increase in Allowances	9.08%	8.09%	5.43%	4.58%	5.84%	6.50%
Average Annual Allowance	\$ 24,777	\$ 25,185	\$ 25,042	\$ 24,981	\$ 25,162	\$ 25,143



**Non-Hazardous Retired Lives Summary June 30, 2016**

	Male Lives		Female Lives		Total	
	Number	Monthly Benefits	Number	Monthly Benefits	Number	Monthly Benefits
Basic Form	5,246	\$ 5,422,808.24	18,279	\$ 13,293,765.38	23,525	\$ 18,716,573.62
Straight Life (Old Plan)	0	0.00	0	0.00	0	0.00
Joint & Survivor						
100% to Beneficiary	2,896	3,235,044.69	1,529	958,150.63	4,425	4,193,195.32
66-2/3% to Beneficiary	787	1,436,964.62	557	592,517.99	1,344	2,029,482.61
50% to Beneficiary	1,110	1,775,175.82	1,524	1,781,062.61	2,634	3,556,238.43
Pop-up Option	3,989	6,240,512.44	3,442	3,660,737.18	7,431	9,901,249.62
10 Years Certain	0	0.00	0	0.00	0	0.00
10 Years Certain & Life	1,387	1,388,846.95	3,323	2,503,312.64	4,710	3,892,159.59
Social Security Option						
Age 62 Basic	259	469,812.65	519	546,765.68	778	1,016,578.33
Age 62 Survivorship	601	1,135,477.82	338	347,558.40	939	1,483,036.22
Partial Deferred (Old Plan)	0	0.00	0	0.00	0	0.00
Widows Age 60	0	0.00	0	0.00	0	0.00
Dependent Child	0	0.00	0	0.00	0	0.00
Refund	0	0.00	0	0.00	0	0.00
15 Years Certain & Life	630	644,735.07	813	610,666.45	1,443	1,255,401.52
20 Years Certain & Life	469	634,464.67	711	549,892.36	1,180	1,184,357.03
5 Years Certain	0	0.00	0	0.00	0	0.00
PLSO 12 Month Basic	102	120,299.17	371	317,429.45	473	437,728.62
PLSO 24 Month Basic	61	43,319.47	251	198,459.42	312	241,778.89
PLSO 36 Month Basic	265	129,304.89	718	324,738.60	983	454,043.49
PLSO 12 Month Survivor	149	184,690.19	96	97,275.98	245	281,966.17
PLSO 24 Month Survivor	91	93,053.24	63	41,314.32	154	134,367.56
PLSO 36 Month Survivor	406	259,217.32	280	127,039.50	686	386,256.82
<b>Total</b>	<b>18,448</b>	<b>\$ 23,213,727.25</b>	<b>32,814</b>	<b>\$ 25,950,686.59</b>	<b>51,262</b>	<b>\$ 49,164,413.84</b>



**Hazardous Retired Lives Summary June 30, 2016**

	Male Lives		Female Lives		Total	
	Number	Monthly Benefits	Number	Monthly Benefits	Number	Monthly Benefits
Basic Form	1,046	\$ 2,116,711.69	315	\$ 492,776.38	1,361	\$ 2,609,488.07
Straight Life (Old Plan)	0	0.00	0	0.00	0	0.00
Joint & Survivor						
100% to Beneficiary	804	1,651,813.96	35	42,570.08	839	1,694,384.04
66-2/3% to Beneficiary	306	768,703.31	9	18,908.25	315	787,611.56
50% to Beneficiary	456	1,094,753.82	36	75,668.51	492	1,170,422.33
Pop-up Option	2,939	7,456,500.41	134	264,587.48	3,073	7,721,087.89
10 Years Certain	75	123,266.43	7	6,528.43	82	129,794.86
10 Years Certain & Life	209	432,295.17	58	104,453.38	267	536,748.55
Social Security Option						
Age 62 Basic	108	207,404.49	13	24,031.47	121	231,435.96
Age 62 Survivorship	293	547,263.55	17	37,261.67	310	584,525.22
Partial Deferred (Old Plan)	0	0.00	0	0.00	0	0.00
Widows Age 60	0	0.00	0	0.00	0	0.00
Dependent Child	0	0.00	0	0.00	0	0.00
Refund	0	0.00	0	0.00	0	0.00
15 Years Certain & Life	93	177,046.18	15	21,521.35	108	198,567.53
20 Years Certain & Life	154	314,906.21	30	46,442.17	184	361,348.38
5 Years Certain	0	0.00	0	0.00	0	0.00
PLSO 12 Month Basic	26	45,792.55	9	12,126.97	35	57,919.52
PLSO 24 Month Basic	20	42,770.68	6	6,336.10	26	49,106.78
PLSO 36 Month Basic	54	85,677.20	20	23,431.10	74	109,108.30
PLSO 12 Month Survivor	59	147,922.19	4	8,080.23	63	156,002.42
PLSO 24 Month Survivor	68	110,449.90	2	2,220.11	70	112,670.01
PLSO 36 Month Survivor	138	213,016.26	6	6,248.86	144	219,265.12
<b>Total</b>	<b>6,848</b>	<b>\$ 15,536,294.00</b>	<b>716</b>	<b>\$ 1,193,192.54</b>	<b>7,564</b>	<b>\$ 16,729,486.54</b>



**Non-Hazardous Beneficiary Lives Summary June 30, 2016**

	Male Lives		Female Lives		Total	
	Number	Monthly Benefits	Number	Monthly Benefits	Number	Monthly Benefits
Basic Form	14	\$ 3,932	36	19,771	50	\$ 23,702.91
Straight Life (Old Plan)	0	0	0	0	0	0.00
Joint & Survivor						
100% to Beneficiary	406	221,564	1,629	1,101,507	2,035	1,323,071.67
66-2/3% to Beneficiary	53	27,091	249	198,349	302	225,440.53
50% to Beneficiary	130	49,688	401	227,479	531	277,166.44
Pop-up Option	187	144,264	672	663,532	859	807,796.23
10 Years Certain	135	86,698	160	134,447	295	221,144.81
10 Years Certain & Life	62	45,452	73	56,599	135	102,050.90
Social Security Option						
Age 62 Basic	0	0	5	5,664	5	5,663.59
Age 62 Survivorship	27	16,243	150	220,489	177	236,732.22
Partial Deferred (Old Plan)	0	0	0	0	0	0.00
Widows Age 60	0	0	1	207	1	206.92
Dependent Child	0	0	0	0	0	0.00
Refund	3	1,796	5	3,221	8	5,016.60
15 Years Certain & Life	40	34,134	71	55,570	111	89,704.37
20 Years Certain & Life	47	31,343	61	65,873	108	97,216.11
5 Years Certain	98	69,789	104	68,726	202	138,514.59
PLSO 12 Month Basic	0	0	0	0	0	0.00
PLSO 24 Month Basic	0	0	0	0	0	0.00
PLSO 36 Month Basic	1	149	1	152	2	301.45
PLSO 12 Month Survivor	9	3,293	43	43,325	52	46,617.47
PLSO 24 Month Survivor	12	13,559	29	26,758	41	40,317.38
PLSO 36 Month Survivor	39	19,868	124	57,549	163	77,416.95
<b>Total</b>	<b>1,263</b>	<b>\$ 768,863.23</b>	<b>3,814</b>	<b>\$ 2,949,217.91</b>	<b>5,077</b>	<b>\$ 3,718,081.14</b>



**Hazardous Beneficiary Lives Summary June 30, 2016**

	Male Lives		Female Lives		Total	
	Number	Monthly Benefits	Number	Monthly Benefits	Number	Monthly Benefits
Basic Form	11	\$ 4,957	38	31,591	49	\$ 36,548.47
Straight Life (Old Plan)	0	0	0	0	0	0.00
Joint & Survivor						
100% to Beneficiary	18	9,584	229	290,143	247	299,727.18
66-2/3% to Beneficiary	3	688	54	77,703	57	78,390.58
50% to Beneficiary	8	4,907	71	69,709	79	74,616.15
Pop-up Option	39	23,886	257	413,033	296	436,918.92
10 Years Certain	18	15,001	20	14,325	38	29,325.54
10 Years Certain & Life	5	3,522	5	3,062	10	6,584.07
Social Security Option						
Age 62 Basic	0	0	1	310	1	310.13
Age 62 Survivorship	0	0	107	167,558	107	167,557.84
Partial Deferred (Old Plan)	0	0	0	0	0	0.00
Widows Age 60	0	0	3	3,287	3	3,287.07
Dependent Child	0	0	0	0	0	0.00
Refund	8	2,482	17	9,973	25	12,455.67
15 Years Certain & Life	4	1,488	4	886	8	2,373.52
20 Years Certain & Life	4	1,520	11	9,497	15	11,017.23
5 Years Certain	3	4,969	2	3,185	5	8,153.98
PLSO 12 Month Basic	0	0	0	0	0	0.00
PLSO 24 Month Basic	0	0	1	1,466	1	1,466.49
PLSO 36 Month Basic	2	562	3	1,619	5	2,180.71
PLSO 12 Month Survivor	0	0	6	4,611	6	4,610.53
PLSO 24 Month Survivor	1	1,295	10	7,091	11	8,385.88
PLSO 36 Month Survivor	5	2,056	31	26,389	36	28,445.28
<b>Total</b>	<b>129</b>	<b>\$ 76,917.48</b>	<b>870</b>	<b>\$ 1,135,437.76</b>	<b>999</b>	<b>\$ 1,212,355.24</b>



Non-Hazardous Members

Retired and Beneficiary Information June 30, 2016  
Tabulated by Attained Ages

Attained Age	Retirement		Disability Retirement		Survivors and Beneficiaries		Total	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 45	12	\$ 174,366	52	\$ 530,738	164	\$ 1,034,944	228	\$ 1,740,048
45-49	243	\$ 5,498,804	137	\$ 1,632,678	50	\$ 420,748	430	\$ 7,552,230
50-54	1,090	\$ 26,337,640	294	\$ 3,748,460	128	\$ 1,493,514	1,512	\$ 31,579,614
55-59	3,801	\$ 69,234,774	646	\$ 8,011,055	267	\$ 3,013,661	4,714	\$ 80,259,490
60-64	7,633	\$ 107,008,651	848	\$ 10,005,674	481	\$ 5,118,971	8,962	\$ 122,133,296
65-69	11,717	\$ 135,546,196	830	\$ 9,206,949	685	\$ 7,648,622	13,232	\$ 152,401,767
70-74	9,169	\$ 90,754,780	544	\$ 5,378,722	723	\$ 6,901,849	10,436	\$ 103,035,351
75-79	6,617	\$ 59,660,429	392	\$ 3,770,797	688	\$ 6,242,891	7,697	\$ 69,674,117
80-84	3,955	\$ 31,425,914	163	\$ 1,339,584	631	\$ 5,251,930	4,749	\$ 38,017,428
85-89	2,053	\$ 14,645,435	37	\$ 250,147	538	\$ 3,970,158	2,628	\$ 18,865,740
90 & Over	1,021	\$ 5,764,209	8	\$ 46,964	722	\$ 3,519,686	1,751	\$ 9,330,859
Totals	47,311	\$ 546,051,198	3,951	\$ 43,921,768	5,077	\$ 44,616,974	56,339	\$ 634,589,940



**Hazardous Members**

**Retired and Beneficiary Information June 30, 2016  
Tabulated by Attained Ages**

Attained Age	Retirement		Disability Retirement		Survivors and Beneficiaries		Total	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 45	105	\$ 2,930,742	67	\$ 1,120,002	196	\$ 1,173,460	368	\$ 5,224,204
45-49	646	\$ 20,619,370	77	\$ 1,421,440	34	\$ 319,892	757	\$ 22,360,702
50-54	1,060	\$ 34,263,894	95	\$ 1,731,042	52	\$ 735,248	1,207	\$ 36,730,184
55-59	1,147	\$ 33,491,434	86	\$ 1,412,301	75	\$ 990,046	1,308	\$ 35,893,781
60-64	1,381	\$ 37,926,346	93	\$ 1,337,831	110	\$ 1,989,031	1,584	\$ 41,253,208
65-69	1,333	\$ 33,502,275	64	\$ 997,141	134	\$ 2,192,720	1,531	\$ 36,692,136
70-74	760	\$ 16,572,074	26	\$ 374,225	136	\$ 2,718,700	922	\$ 19,664,999
75-79	400	\$ 8,267,166	4	\$ 73,252	118	\$ 2,304,448	522	\$ 10,644,866
80-84	148	\$ 3,183,883	6	\$ 48,656	83	\$ 1,270,822	237	\$ 4,503,361
85-89	56	\$ 1,285,015	0	\$ -	45	\$ 680,603	101	\$ 1,965,618
90 & Over	9	\$ 175,829	1	\$ 19,920	16	\$ 173,293	26	\$ 369,042
Totals	7,045	\$ 192,218,028	519	\$ 8,535,810	999	\$ 14,548,263	8,563	\$ 215,302,101



**Total Non-Hazardous Active Members as of June 30, 2016  
Tabulated by Attained Ages and Years of Service**

Attained Age	Years of Service to Valuation Date								Totals
	0-4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 26	27 - 29	30+	
Under 20	113		1						114
Avg Pay	\$11,814		\$9,453						\$11,793
20-24	2,255	18	1	1					2,275
Avg Pay	\$18,816	\$29,326	\$11,938	\$12,324					\$18,893
25-29	4,106	603	31			1			4,741
Avg Pay	\$23,325	\$33,004	\$34,433			\$74,817			\$24,640
30-34	3,876	1,519	562	25					5,982
Avg Pay	\$23,792	\$34,189	\$37,664	\$38,971					\$27,799
35-39	4,174	1,796	1,257	563	20	1		1	7,812
Avg Pay	\$22,967	\$32,193	\$38,119	\$43,224	\$47,009	\$40,125		\$20,694	\$29,049
40-44	3,823	2,204	1,679	1,196	356	11	4	1	9,274
Avg Pay	\$22,568	\$30,240	\$34,973	\$42,633	\$48,653	\$53,599	\$82,523	\$80,166	\$30,295
44-49	3,627	2,523	2,293	1,879	845	169	58	22	11,416
Avg Pay	\$23,115	\$29,075	\$31,863	\$37,545	\$45,381	\$54,100	\$56,844	\$68,422	\$30,930
50-54	3,048	2,313	2,468	2,641	1,298	318	217	136	12,439
Avg Pay	\$23,168	\$29,212	\$30,409	\$32,192	\$38,408	\$51,106	\$50,782	\$59,631	\$30,829
55-59	2,621	2,011	2,262	2,656	1,793	408	250	177	12,178
Avg Pay	\$23,181	\$28,207	\$30,187	\$31,417	\$35,210	\$41,434	\$45,186	\$55,577	\$30,414
60-64	1,864	1,655	1,594	1,711	1,287	365	199	182	8,857
Avg Pay	\$21,805	\$28,690	\$30,977	\$32,881	\$33,400	\$40,646	\$38,368	\$56,520	\$30,429
65-69	948	793	679	613	346	122	108	91	3,700
Avg Pay	\$17,243	\$23,641	\$29,051	\$31,812	\$34,010	\$36,516	\$33,738	\$51,018	\$26,711
70 & over	425	428	449	284	142	37	45	66	1,876
Avg Pay	\$15,670	\$19,859	\$23,069	\$26,237	\$26,322	\$33,200	\$30,056	\$43,220	\$22,462
<b>Totals</b>	<b>30,880</b>	<b>15,863</b>	<b>13,276</b>	<b>11,569</b>	<b>6,087</b>	<b>1,432</b>	<b>881</b>	<b>676</b>	<b>80,664</b>
<b>Avg Pay</b>	<b>\$22,434</b>	<b>\$29,579</b>	<b>\$31,994</b>	<b>\$34,448</b>	<b>\$37,471</b>	<b>\$44,360</b>	<b>\$43,785</b>	<b>\$55,229</b>	<b>\$29,167</b>



**Total Hazardous Active Members as of June 30, 2016  
Tabulated by Attained Ages and Years of Service**

Attained Age	Years of Service to Valuation Date								Totals
	0-4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 26	27 - 29	30+	
Under 20	3								3
Avg Pay	\$30,477								\$30,477
20-24	307								307
Avg Pay	\$33,913								\$33,913
25-29	1,034	232	3						1,269
Avg Pay	\$42,249	\$49,558	\$48,247						\$43,600
30-34	629	709	253	2					1,593
Avg Pay	\$44,756	\$53,127	\$55,414	\$57,923					\$50,191
35-39	277	435	685	254	11				1,662
Avg Pay	\$43,690	\$53,153	\$57,581	\$63,910	\$65,500				\$55,126
40-44	125	243	440	696	169	7	4		1,684
Avg Pay	\$40,843	\$52,553	\$56,395	\$65,284	\$72,172	\$79,505	\$87,051		\$60,112
44-49	99	166	290	486	245	40	30	6	1,362
Avg Pay	\$40,086	\$50,942	\$54,918	\$61,704	\$74,499	\$80,093	\$77,045	\$89,658	\$60,679
50-54	43	82	135	200	127	48	33	24	692
Avg Pay	\$39,184	\$50,643	\$55,392	\$60,428	\$66,905	\$76,428	\$83,104	\$82,367	\$61,107
55-59	24	51	60	88	47	15	19	15	319
Avg Pay	\$40,582	\$49,462	\$52,217	\$58,543	\$63,323	\$65,889	\$76,127	\$93,239	\$58,278
60-64	9	26	38	36	20	4	3	11	147
Avg Pay	\$36,291	\$40,253	\$54,011	\$56,082	\$68,172	\$75,492	\$79,534	\$81,139	\$56,062
65-69	3	5	7	8	2	1	2		28
Avg Pay	\$33,404	\$52,810	\$46,009	\$57,721	\$42,915	\$60,158	\$56,262		\$50,236
70 & over	1	4	3	5		1		4	18
Avg Pay	\$50,908	\$32,200	\$36,853	\$72,691		\$9,975		\$95,878	\$58,178
<b>Totals</b>	<b>2,554</b>	<b>1,953</b>	<b>1,914</b>	<b>1,775</b>	<b>621</b>	<b>116</b>	<b>91</b>	<b>60</b>	<b>9,084</b>
<b>Avg Pay</b>	<b>\$41,759</b>	<b>\$52,037</b>	<b>\$56,136</b>	<b>\$63,018</b>	<b>\$71,002</b>	<b>\$75,769</b>	<b>\$79,116</b>	<b>\$86,490</b>	<b>\$54,255</b>



## **SCHEDULE F**

### **SENSITIVITY ANALYSIS**

The valuation results are projections based on the actuarial assumptions. Actual experience will differ from these assumptions, either increasing or decreasing cost. The charts on the following pages provide a simple analysis on how the costs are sensitive to changes to the assumed discount rate, the assumed inflation rate and the rate of payroll growth. The charts show the actuarial accrued liability, the unfunded liability, the funded ratio and the employer contribution rate under the following scenarios:

- The discount rate assumption sensitivity analysis shows the valuation results with the baseline discount rate assumption, 7.50%, together with a decrease in the discount rate to 6.50% and an increase in the discount rate to 8.50%. Under this scenario, the underlying inflation rate assumption is held constant at 3.25% and the payroll growth assumption is held constant at 4.00%.
- The inflation assumption sensitivity analysis shows the valuation results with the baseline underlying inflation rate assumption, 3.25%, together with decreases in the inflation rate to 3.00% and 2.75%. Under this scenario, the decrease in the underlying inflation rate assumption leads to corresponding decreases in the discount rate, the payroll growth assumption and the healthcare trend assumption for members hired before 7/1/2003.
- The payroll growth assumption sensitivity analysis shows the valuation results with the baseline underlying payroll growth assumption, 4.00%, together with decreases in the payroll growth assumption to 2.00% and 0.00%. Under this scenario, all other assumptions, including the individual member salary scale, are held constant so that the only impact is in the amortization of the unfunded liability, leading to higher employer contribution rates.



**NON-HAZARDOUS  
ASSUMED DISCOUNT RATE SENSITIVITY ANALYSIS**

	Decrease Discount Rate	Valuation Results	Increase Discount Rate
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 12,492,249,015	\$ 11,076,456,794	\$ 10,051,855,482
Actuarial Value of Assets	<u>6,535,372,347</u>	<u>6,535,372,347</u>	<u>6,535,372,347</u>
Unfunded Liability	\$ 5,956,876,668	\$ 4,541,084,447	\$ 3,516,483,135
Funded Ratio	52.32%	59.00%	65.02%
Contribution Rate	18.18%	14.48%	11.56%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 3,374,299,272	\$ 2,988,121,117	\$ 2,666,546,277
Actuarial Value of Assets	<u>2,079,811,055</u>	<u>2,079,811,055</u>	<u>2,079,811,055</u>
Unfunded Liability	\$ 1,294,488,217	\$ 908,310,062	\$ 586,735,222
Funded Ratio	61.64%	69.60%	78.00%
Contribution Rate	6.08%	4.70%	3.50%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>CERS Non-Hazardous Total</b>			
Actuarial Accrued Liability	\$ 15,866,548,287	\$ 14,064,577,911	\$ 12,718,401,759
Actuarial Value of Assets	<u>8,615,183,402</u>	<u>8,615,183,402</u>	<u>8,615,183,402</u>
Unfunded Liability	\$ 7,251,364,885	\$ 5,449,394,509	\$ 4,103,218,357
Funded Ratio	54.30%	61.25%	67.74%
Contribution Rate	24.26%	19.18%	15.06%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%



**NON-HAZARDOUS  
INFLATION ASSUMPTION SENSITIVITY ANALYSIS**

Valuation Results	Decrease Inflation Rate 25 basis points	Decrease Inflation Rate 50 basis points
<b>Retirement</b>		
Actuarial Accrued Liability	\$ 11,076,456,794	\$ 11,324,806,709
Actuarial Value of Assets	<u>6,535,372,347</u>	<u>6,535,372,347</u>
Unfunded Liability	\$ 4,541,084,447	\$ 4,789,434,362
Funded Ratio	59.00%	57.71%
Contribution Rate	14.48%	15.35%
Discount Rate	7.50%	7.25%
Payroll Growth	4.00%	3.75%
Inflation Rate	3.25%	3.00%
<b>Insurance</b>		
Actuarial Accrued Liability	\$ 2,988,121,117	\$ 3,002,167,664
Actuarial Value of Assets	<u>2,079,811,055</u>	<u>2,079,811,055</u>
Unfunded Liability	\$ 908,310,062	\$ 922,356,609
Funded Ratio	69.60%	69.28%
Contribution Rate	4.70%	4.79%
Discount Rate	7.50%	7.25%
Payroll Growth	4.00%	3.75%
Inflation Rate	3.25%	3.00%
<b>CERS Non-Hazardous Total</b>		
Actuarial Accrued Liability	\$ 14,064,577,911	\$ 14,326,974,373
Actuarial Value of Assets	<u>8,615,183,402</u>	<u>8,615,183,402</u>
Unfunded Liability	\$ 5,449,394,509	\$ 5,711,790,971
Funded Ratio	61.25%	60.13%
Contribution Rate	19.18%	20.14%
Discount Rate	7.50%	7.25%
Payroll Growth	4.00%	3.75%
Inflation Rate	3.25%	3.00%



**NON-HAZARDOUS  
PAYROLL GROWTH SENSITIVITY ANALYSIS**

	Valuation Results	Decrease Payroll Growth 2%	No Payroll Growth
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 11,076,456,794	\$ 11,076,456,794	\$ 11,076,456,794
Actuarial Value of Assets	<u>6,535,372,347</u>	<u>6,535,372,347</u>	<u>6,535,372,347</u>
Unfunded Liability	\$ 4,541,084,447	\$ 4,541,084,447	\$ 4,541,084,447
Funded Ratio	59.00%	59.00%	59.00%
Contribution Rate	14.48%	17.18%	20.28%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 2,988,121,117	\$ 2,988,121,117	\$ 2,988,121,117
Actuarial Value of Assets	<u>2,079,811,055</u>	<u>2,079,811,055</u>	<u>2,079,811,055</u>
Unfunded Liability	\$ 908,310,062	\$ 908,310,062	\$ 908,310,062
Funded Ratio	69.60%	69.60%	69.60%
Contribution Rate	4.70%	5.18%	5.71%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>CERS Non-Hazardous Total</b>			
Actuarial Accrued Liability	\$ 14,064,577,911	\$ 14,064,577,911	\$ 14,064,577,911
Actuarial Value of Assets	<u>8,615,183,402</u>	<u>8,615,183,402</u>	<u>8,615,183,402</u>
Unfunded Liability	\$ 22,679,761,313	\$ 22,679,761,313	\$ 22,679,761,313
Funded Ratio	61.25%	61.25%	61.25%
Contribution Rate	19.18%	22.36%	25.99%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%



**HAZARDOUS  
ASSUMED DISCOUNT RATE SENSITIVITY ANALYSIS**

	Decrease Discount Rate	Valuation Results	Increase Discount Rate
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 4,135,351,830	\$ 3,704,456,223	\$ 3,344,701,905
Actuarial Value of Assets	<u>2,139,119,173</u>	<u>2,139,119,173</u>	<u>2,139,119,173</u>
Unfunded Liability	\$ 1,996,232,657	\$ 1,565,337,050	\$ 1,205,582,732
Funded Ratio	51.73%	57.74%	63.96%
Contribution Rate	27.52%	22.20%	17.45%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 1,770,770,019	\$ 1,558,818,204	\$ 1,385,919,568
Actuarial Value of Assets	<u>1,135,784,220</u>	<u>1,135,784,220</u>	<u>1,135,784,220</u>
Unfunded Liability	\$ 634,985,799	\$ 423,033,984	\$ 250,135,348
Funded Ratio	64.14%	72.86%	81.95%
Contribution Rate	12.42%	9.35%	6.65%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>CERS Hazardous Total</b>			
Actuarial Accrued Liability	\$ 5,906,121,849	\$ 5,263,274,427	\$ 4,730,621,473
Actuarial Value of Assets	<u>3,274,903,393</u>	<u>3,274,903,393</u>	<u>3,274,903,393</u>
Unfunded Liability	\$ 2,631,218,456	\$ 1,988,371,034	\$ 1,455,718,080
Funded Ratio	55.45%	62.22%	69.23%
Contribution Rate	39.94%	31.55%	24.10%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%



**HAZARDOUS  
INFLATION ASSUMPTION SENSITIVITY ANALYSIS**

Valuation Results	Decrease Inflation Rate 25 basis points	Decrease Inflation Rate 50 basis points
<b>Retirement</b>		
Actuarial Accrued Liability	\$ 3,704,456,223	\$ 3,794,896,768
Actuarial Value of Assets	<u>2,139,119,173</u>	<u>2,139,119,173</u>
Unfunded Liability	\$ 1,565,337,050	\$ 1,655,777,595
Funded Ratio	57.74%	56.37%
Contribution Rate	22.20%	23.66%
Discount Rate	7.50%	7.25%
Payroll Growth	4.00%	3.75%
Inflation Rate	3.25%	3.00%
<b>Insurance</b>		
Actuarial Accrued Liability	\$ 1,558,818,204	\$ 1,563,005,462
Actuarial Value of Assets	<u>1,135,784,220</u>	<u>1,135,784,220</u>
Unfunded Liability	\$ 423,033,984	\$ 427,221,242
Funded Ratio	72.86%	72.67%
Contribution Rate	9.35%	9.46%
Discount Rate	7.50%	7.25%
Payroll Growth	4.00%	3.75%
Inflation Rate	3.25%	3.00%
<b>CERS Hazardous Total</b>		
Actuarial Accrued Liability	\$ 5,263,274,427	\$ 5,357,902,230
Actuarial Value of Assets	<u>3,274,903,393</u>	<u>3,274,903,393</u>
Unfunded Liability	\$ 1,988,371,034	\$ 2,082,998,837
Funded Ratio	62.22%	61.12%
Contribution Rate	31.55%	33.12%
Discount Rate	7.50%	7.25%
Payroll Growth	4.00%	3.75%
Inflation Rate	3.25%	3.00%



**HAZARDOUS  
PAYROLL GROWTH ASSUMPTION SENSITIVITY ANALYSIS**

	Valuation Results	Decrease Payroll Growth 2%	No Payroll Growth
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 3,704,456,223	\$ 3,704,456,223	\$ 3,704,456,223
Actuarial Value of Assets	<u>2,139,119,173</u>	<u>2,139,119,173</u>	<u>2,139,119,173</u>
Unfunded Liability	\$ 1,565,337,050	\$ 1,565,337,050	\$ 1,565,337,050
Funded Ratio	57.74%	57.74%	57.74%
Contribution Rate	22.20%	26.63%	31.71%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 1,558,818,204	\$ 1,558,818,204	\$ 1,558,818,204
Actuarial Value of Assets	<u>1,135,784,220</u>	<u>1,135,784,220</u>	<u>1,135,784,220</u>
Unfunded Liability	\$ 423,033,984	\$ 423,033,984	\$ 423,033,984
Funded Ratio	72.86%	72.86%	72.86%
Contribution Rate	9.35%	10.42%	11.60%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>CERS Hazardous Total</b>			
Actuarial Accrued Liability	\$ 5,263,274,427	\$ 5,263,274,427	\$ 5,263,274,427
Actuarial Value of Assets	<u>3,274,903,393</u>	<u>3,274,903,393</u>	<u>3,274,903,393</u>
Unfunded Liability	\$ 1,988,371,034	\$ 1,988,371,034	\$ 1,988,371,034
Funded Ratio	62.22%	62.22%	62.22%
Contribution Rate	31.55%	37.05%	43.31%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%



**Cavanaugh Macdonald**  
CONSULTING, LLC

*The experience and dedication you deserve*



## **Report on the Annual Valuation of the State Police Retirement System**

**Prepared as of June 30, 2016**





# Cavanaugh Macdonald

CONSULTING, LLC

*The experience and dedication you deserve*

November 16, 2016

Board of Directors  
Kentucky Retirement Systems  
Perimeter Park West  
1260 Louisville Road  
Frankfort, KY 40601

Dear Members of the Board:

Presented in this report are the results of the annual actuarial valuation of the retirement and insurance benefits provided under the State Police Retirement System (SPRS). The purpose of the valuation was to measure the System's funding progress. The date of the valuation was June 30, 2016.

The valuation was based upon data, furnished by the Executive Director and the Kentucky Retirement Systems (KRS) staff, concerning active, inactive and retired members along with pertinent financial information. The complete cooperation of the KRS staff in furnishing materials requested is hereby acknowledged with appreciation.

To the best of our knowledge, this report is complete and accurate. The valuation was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. The valuation was prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board.

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the system, and on actuarial assumptions that are, in the aggregate, internally consistent and reasonably based on the actual experience of the system.

Respectfully submitted,

Todd B. Green ASA, FCA, MAAA  
Principal and Consulting Actuary

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## **TABLE OF CONTENTS**

<b><u>Section</u></b>	<b><u>Item</u></b>	<b><u>Page No.</u></b>
I	Summary of Principal Results	1
II	Membership Data	4
III	Assets	5
IV	Comments on Valuation	6
V	Derivation of Experience Gains and Losses	8
VI	Actuarially Determined Contribution Rates	11
VII	Accounting Information	13
<b><u>Schedule</u></b>		
A	Valuation Balance Sheet and Solvency Test	17
B	Development of Actuarial Value of Assets	20
C	Statement of Actuarial Assumptions and Methods	22
D	Summary of Main Benefit and Contribution Provisions	29
E	Detailed Tabulations of the Data	36
F	Sensitivity Analysis	41



**REPORT ON THE ANNUAL VALUATION OF THE  
STATE POLICE RETIREMENT SYSTEM**

**PREPARED AS OF JUNE 30, 2016**

**SECTION I – SUMMARY OF PRINCIPAL RESULTS**

This report, prepared as of June 30, 2016, presents the results of the annual actuarial valuation of the retirement and insurance benefits provided under the System. For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized in the following table.

**SUMMARY OF PRINCIPAL RESULTS**

	6/30/2016	6/30/2015
<b>Contributions for next fiscal year:</b>		
Retirement	71.57%	66.47%
Insurance	<u>18.10</u>	<u>18.87</u>
Total	89.67%	85.34%
<b>Funded status as of valuation date:</b>		
Retirement		
Actuarial accrued liability	\$775,160,294	\$734,156,446
Actuarial value of assets	234,567,536	248,387,946
Unfunded liability on actuarial value of assets	540,592,758	485,768,500
Funded ratio on actuarial value of assets	30.26%	33.83%
Market value of assets	\$217,594,068	\$246,968,144
Unfunded liability on market value of assets	557,566,226	487,188,302
Funded ratio on market value of assets	28.07%	33.64%
Insurance		
Actuarial accrued liability	\$257,197,259	\$254,838,710
Actuarial value of assets	172,703,691	167,774,940
Unfunded liability on actuarial value of assets	84,493,568	87,063,770
Funded ratio on actuarial value of assets	67.15%	65.84%
Market value of assets	\$161,366,312	\$165,018,209
Unfunded liability on market value of assets	95,830,947	89,820,501
Funded ratio on market value of assets	62.74%	64.75%
<b>Demographic data as of valuation date:</b>		
Number of retired participants and beneficiaries	1,515	1,460
Number of vested former members	65	63
Number of former members due a refund	390	362
Number of active members	908	937
Total salary	\$45,551,469	\$45,764,515
Average salary	\$50,167	\$48,842



The State Police Retirement System is a defined benefit pension fund that provides pensions and health care coverage for uniformed state police officers. This report presents the results of the June 30, 2016 actuarial funding valuation for both the Retirement Plan and the Insurance Fund. The primary purpose of performing the actuarial funding valuations are to:

- Determine the experience of the System since the last valuation date.
- Disclose asset and liability measures as of the valuation date.
- Analyze and report on trends in contributions, assets, and liabilities over the past several years.

Since the previous valuation there were no changes to the plan provisions, however the discount rate has been changed to 6.75% for the Pension Plan. The discount rate for the Insurance Fund remains at 7.50%.

The actuarial valuation results provide “snapshot” view the System’s financial condition on June 30, 2016. Actuarial gains and losses result when actuarial experience of the plan (such as asset return, pay increases, turnover, deaths, etc.) is different from the expected by the actuarial assumptions. The Retirement Plan’s Unfunded Actuarial Accrued Liability (UAAL) was expected to be \$498.5 million taking into account contributions from both the employer and members of \$31.0 million. The actual UAAL was \$540.6 million. The increase of \$42.1 million was due to the change in the discount rate offset by an actuarial gain due to actual experience different than what was anticipated by the assumptions. The Insurance Funds UAAL was expected to be \$88.5 million taking into account expected employer and member contributions of \$8.7 million. The actual UAAL was \$84.5 million. The decrease in the UAAL of \$4.0 million was due to the change in actuarial assumptions offset by an actuarial loss due to actuarial experience different than what was anticipated by the assumptions.

The remaining amortization period of the UAAL of both the Pension and Insurance Funds is 27-years as of June 30, 2016. Detailed analysis of the gains and losses are presented in Section V of the report.

As of June 30, 2016 the Pension and Insurance Funds had net assets of \$217,594,068 and \$161,366,312 respectively. The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the actuarially determined contribution. The asset valuation method which recognizes the annual unexpected portion of market value investment returns over a five-year period, attempts to dampen the effect of market volatility. The resulting amount is called the “actuarial value of assets” and is utilized to determine the actuarial valuation results. In this year’s actuarial valuation, the actuarial value of assets as of June 30, 2016 was \$234,567,536 and \$172,703,691 respectively for the Pension and Insurance Funds.



On a market basis, the estimated rate of return was (1.7)% and 0.0% respectively for the Pension and Insurance Funds, assuming all cash flows occur in the middle of the year. Due to better than assumed prior returns on the market value of assets the net rate of return measured on the actuarial value of assets was 5.0% and 5.1% respectively for both the Pension and Insurance Funds. Please see Section III and Schedule B of this report for more detailed information on the market and actuarial value of assets.

Schedule F provides sensitivity analysis for three different sets of economic assumptions; the discount rate assumption, the inflation assumption, and the payroll growth assumption. Two assumption change scenarios are presented for each economic assumption. The results of the economic assumption change scenarios are presented along with the valuation results for comparison.

The long-term financial health of this retirement System, like all retirement systems, is heavily dependent on two key items: (1) future investment returns and (2) contributions to the System. The System has recently been strengthened due to two reasons. They are, recent legislative action that provides 100% funding of the actuarially determined contribution and the elimination of unfunded ad hoc cost-of-living adjustments for retirees. The cost for providing cost-of-living adjustments for retirees must be prefunded in advance.



## **SECTION II – MEMBERSHIP DATA**

Data regarding the membership of the System for use as a basis for the valuation were furnished by the System's office. The following tables summarize the membership of the system as of June 30, 2016 upon which the valuation was based. Detailed tabulations of the data are given in Schedule E.

### **Active Members**

Number	Payroll	Group Averages		
		Salary	Age	Service
908	\$45,551,469	\$50,167	37.0	10.0

The following table shows a six-year history of active member valuation data.

### **SCHEDULE OF SPRS ACTIVE MEMBER VALUATION DATA**

Valuation Date	Number	Annual Payroll	Annual Average Pay	% Increase in Average Pay
6/30/2011	965	\$48,692,616	\$50,459	(5.9)%
6/30/2012	907	48,372,506	53,332	5.7
6/30/2013	902	45,256,202	50,173	(5.9)
6/30/2014	855	44,615,885	52,182	4.0
6/30/2015	937	45,764,515	48,842	(6.4)
6/30/2016	908	45,551,469	50,167	2.7

The following table shows the number and annual retirement allowances payable to retired members and their beneficiaries on the roll of the Retirement System as of the valuation date as well as certain group averages.

### **Retired Lives**

Type of Benefit Payment	Number	Annual Benefits	Group Averages	
			Benefit	Age
Retiree	1,263	\$50,522,573	\$40,002	62.3
Disability	53	\$968,489	18,273	58.2
Beneficiary	199	5,158,856	25,924	64.1
Total in SPRS	1,515	\$56,649,918	\$37,393	62.4

This valuation also includes 455 inactive members of which 65 are vested.



**SECTION III - ASSETS**

1. As of June 30, 2016 the total market value of assets amounted to \$378,960,380 as shown in the following table. The Insurance assets include both the amount in the health care trust and the amount in the 401(h) account in the pension trust established to meet the requirements of HB1.

<b>Retirement</b>	<b>Insurance</b>	<b>SPRS Total</b>
\$217,594,068	\$161,366,312	\$378,960,380

2. The five-year smoothed market related actuarial value of assets used for the current valuation was \$407,271,227. Schedule B shows the development of the actuarial value of assets as of June 30, 2016. The following table shows the actuarial value of assets.

**COMPARISON OF ACTUARIAL VALUE OF ASSETS**

	<b>JUNE 30, 2016</b>	<b>JUNE 30, 2015</b>
<b>Retirement</b>	\$ 234,567,536	\$ 248,387,946
<b>Insurance</b>	<u>172,703,691</u>	<u>167,774,940</u>
<b>Total</b>	\$ 407,271,227	\$ 416,162,886



## **SECTION IV - COMMENTS ON VALUATION**

Schedule A of this report contains the valuation balance sheets which show the present and prospective assets and liabilities of the System as of June 30, 2016. Separate balance sheets are shown for Retirement and Insurance.

### **Retirement**

1. The total valuation balance sheet on account of retirement benefits shows that the System has total prospective retirement benefit liabilities of \$851,805,347, of which \$630,842,308 is for the prospective benefits payable on account of present retired members and beneficiaries of deceased members, \$5,656,599 is for the prospective benefits payable on account of inactive members, \$215,306,440 is for the prospective benefits payable on account of present active members. Against these retirement benefit liabilities the System has a total present actuarial value of assets of \$234,567,536 as of June 30, 2016. The difference of \$617,237,811 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of retirement benefits. Of this amount, \$34,857,655 is the present value of future contributions expected to be made by members, and the balance of \$582,380,156 represents the present value of future contributions payable by the State.
2. The State's contributions to the System on account of retirement benefits consist of normal contributions, accrued liability contributions and contributions for administrative expenses. The valuation indicates that employer normal contributions at the rate of 10.79% of payroll are required to fund the continuing benefit accruals for the average active member of SPRS.
3. Prospective employer normal contributions on account of retirement benefits at the above rates have a present value of \$41,787,398. When this amount is subtracted from \$582,380,156, which is the present value of the total future contributions to be made by the State, there remains \$540,592,758 as the amount of future accrued liability contributions.
4. It is recommended that the accrued liability contribution rate payable by the State on account of retirement benefits be set at 60.41% of payroll. This rate is sufficient to liquidate the unfunded accrued liability of \$540,592,758 over 27 years on the assumption that the aggregate payroll for members will increase by 4.00% each year.
5. The contribution rate for administrative expenses is determined to be 0.37% of payroll.



## Insurance

1. The total valuation balance sheet on account of insurance benefits shows that the System has total prospective insurance benefit liabilities of \$280,211,827, of which \$171,154,508 is for the prospective benefits payable on account of present retired members and beneficiaries of deceased members, \$5,939,567 is for the prospective benefits payable on account of inactive members, and \$103,117,752 is for the prospective benefits payable on account of present active members. Against these insurance benefit liabilities the System has a total present actuarial value of assets of \$172,703,691 as of June 30, 2016. The difference of \$107,508,136 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of insurance benefits. Of this amount, \$1,699,282 is the present value of future contributions expected to be made by members, and the balance of \$105,808,854 represents the present value of future contributions payable by the State.
2. The State's contributions to the System on account of insurance benefits consist of normal contributions and accrued liability contributions. The valuation indicates that employer normal contributions at the rate of 7.74% of payroll are required to fund the continuing benefit accruals for the average active member of SPRS.
3. Prospective employer normal contributions on account of insurance benefits at the above rates have a present value of \$21,315,286. When this amount is subtracted from \$105,808,854, which is the present value of the total future contributions to be made by the employers, there remains \$84,493,568 as the amount of future accrued liability contributions.
4. It is recommended that the accrued liability contribution rate payable by the State on account of insurance benefits be set at 10.22% of payroll. This rate is sufficient to liquidate the unfunded accrued liability of \$84,493,568 over 27 years on the assumption that the aggregate payroll for members will increase by 4.00% each year.
5. The contribution rate for administrative expenses is determined to be 0.14% of payroll.



## SECTION V – DERIVATION OF EXPERIENCE GAINS AND LOSSES

Actual experience will never (except by coincidence) coincide exactly with assumed experience. It is assumed that gains and losses will be in balance over a period of years, but sizable year to year fluctuations are common. Detail on the derivation of the experience gain (loss) for the year ended June 30, 2016 is shown below (\$ millions).

### Experience Gain/(Loss) Retirement Benefits

		Amount	
(1)	UAAL* as of 6/30/15	\$	485.8
(2)	Normal cost from last valuation		7.8
(3)	Contributions		31.0
(4)	Interest accrual: [(1) + (2)] x .075 - (3) x .0375		35.9
(5)	Expected UAAL before changes: (1) + (2) - (3) + (4)	\$	498.5
(6)	Change due to new actuarial assumption or methods		(53.4)
(7)	Expected UAAL after changes: (5) - (6)	\$	551.9
(8)	Actual UAAL as of 6/30/16	\$	540.6
(9)	Gain/(loss): (7) - (8)	\$	11.3
(10)	Accrued liabilities as of 6/30/15	\$	734.2
(11)	Gain/(loss) as percent of actuarial accrued liabilities at start of year		1.5%

\*Unfunded actuarial accrued liability



**Experience Gain/(Loss)  
Insurance Benefits**

		Amount	
(1)	UAAL* as of 6/30/15	\$	87.1
(2)	Normal cost from last valuation		4.0
(3)	Expected contributions		<u>8.7</u>
(4)	Interest accrual: [(1) + (2) - (3)] x .075		6.1
(5)	Expected UAAL before changes: (1) + (2) - (3) + (4)	\$	88.5
(6)	Change due to new actuarial assumption or methods		0.0
(7)	Expected UAAL after changes: (5) - (6)	\$	88.5
(8)	Actual UAAL as of 6/30/16	\$	84.5
(9)	Gain/(loss): (7) - (8)	\$	4.0
(10)	Accrued liabilities as of 6/30/15	\$	254.8
(11)	Gain/(loss) as percent of actuarial accrued liabilities at start of year		1.6%

\* *Unfunded Actuarial Accrued Liability*



**SPRS MEMBERS  
ANALYSIS OF FINANCIAL EXPERIENCE**

**Gains & Losses in Accrued Liabilities  
Resulting from Difference Between  
Assumed Experience & Actual Experience  
(\$ Millions)**

Type of Activity	Retirement \$ Gain (or Loss) For Year Ending 6/30/16	Insurance \$ Gain (or Loss) For Year Ending 6/30/16
<b>Age &amp; Service Retirements.</b> If members retire at older ages, there is a gain. If younger ages, a loss.	\$ (11.2)	\$ (1.0)
<b>Disability Retirements.</b> If disability claims are less than assumed, there is a gain. If more claims, a loss.	0.0	0.0
<b>Death-in Service Benefits.</b> If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	0.0	0.0
<b>Withdrawal From Employment.</b> If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	(1.3)	(0.8)
<b>Pay or Claims Increases.</b> If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss. For insurance, smaller claims increases than assumed creates a gain; larger, a loss.	2.0	10.3
<b>New Members.</b> Additional unfunded accrued liability will produce a loss.	0.0	(0.1)
<b>Investment Income.</b> If there is a greater investment income than assumed, there is a gain. If less income, a loss.	(6.2)	(3.9)
<b>Death or Waiver After Retirement.</b> If retired members live longer than assumed, there is a loss. If not as long, a gain. If retired members receiving health benefits later waive coverage, there is a gain.	26.8	1.2
<b>Other.</b> Miscellaneous gains and losses resulting from changes in valuation software, data adjustments, timing of financial transactions, insurance election changes, etc.	<u>1.2</u>	<u>(1.7)</u>
<b>Gain (or Loss) During Year From Financial Experience</b>	\$ 11.3	\$ 4.0
<b>Non-Recurring Items.</b> Adjustments for plan amendments, assumption changes, method changes and data corrections	<u>(53.4)</u>	<u>0.0</u>
<b>Composite Gain (or Loss) During Year</b>	\$ (42.1)	\$ 4.0



## **SECTION VI – ACTUARIALLY DETERMINED CONTRIBUTION RATES**

The valuation balance sheet gives the basis for determining the percentage rates for contributions to be made by the State to the Retirement System. The following tables show the rates of contribution payable by employers as determined from the present valuation. This rate is for informational purposes only.

### **Actuarially Determined Contribution Rates**

#### **Retirement**

<b>Contribution Rate for</b>	<b>% of Payroll</b>
A. Normal Cost:	
(1) Service retirement benefits	18.05%
(2) Disability benefits	0.59
(3) Survivor benefits	0.15
(4) Total	<u>18.79%</u>
B. Member Contributions	8.00%
C. Employer Normal Cost: [A(4) - B]	10.79%
D. Administrative Expenses	0.37%
E. Unfunded Actuarial Accrued Liability Contributions:	60.41%
F. Total Recommended Employer Contribution Rate: [C+D+E]	71.57%

\* Based on 27 year amortization of the UAAL from June 30, 2016



## Actuarially Determined Contribution Rates

### Insurance

Contribution Rate for	% of Payroll
A. Normal Cost	8.01%
B. Member Contributions*	0.27%
C. Employer Normal Cost: [A - B]	7.74%
D. Administrative Expenses	0.14%
E. Unfunded Actuarial Accrued Liability**	10.22%
F. Total Recommended Employer Contribution Rate: [C+D+E]	18.10%

*\*The liabilities are net of retiree contributions toward their healthcare.*

*\*\* Based on 27 year amortization of the UAAL from June 30, 2016*



**SECTION VII - ACCOUNTING INFORMATION**

Governmental Accounting Standards Board Statements (GASB) 43, 45, 67 and 68 set forth certain items of required supplementary information to be disclosed in the financial statements of the System and the employer. The information required under GASB 67 and 68 will be issued in separate reports. We are providing the retirement benefit information for informational purposes only. One such item is a distribution of the number of employees by type of membership, as follows:

**NUMBER OF ACTIVE AND RETIRED MEMBERS  
AS OF JUNE 30, 2016**

<b>GROUP</b>	<b>NUMBER</b>
Retirees and beneficiaries currently receiving benefits	1,515
Terminated employees entitled to benefits but not yet receiving benefits	455
Active Members	<u>908</u>
Total	2,878

Another such item is the Schedule of Funding Progress for retirement and insurance benefits separately as shown in the following tables. Please note that for the retiree health care liabilities of those under age 65, the current premium charged by the Kentucky Employees' Health Plan (KEHP) is used as the base cost and is projected forward using the health care trend assumption. No implicit rate subsidy is calculated or recognized as the implicit rate subsidy is deemed the responsibility of the KEHP. Under Actuarial Standard of Practice No. 6 (ASOP No. 6), aging subsidies (or implicit rate subsidies) should be recognized, as the differences in health care utilization and cost due to age have been demonstrated and well quantified. The impact of aging on a valuation's results can be as significant as the use of mortality, trend, and discounting. It has been the long-standing position that the responsibility for compliance with GASB Statement No. 43, when it relates to KEHP implicit subsidies, rests with KEHP, not KRS, as KRS has no operational authority over KEHP. As such, KEHP implicit subsidies are excluded from the OPEB valuation process of the Retiree Medical Plan. As GASB 74 and 75 prohibit such a deviation from ASOP No. 6, additional consideration to the current treatment of KEHP implicit rate subsidies may be needed in the future. The estimated impact of KEHP implicit subsidies to the actuarial accrued liability is an increase of \$28,253,706 for SPRS.



**RETIREMENT BENEFITS  
SCHEDULE OF FUNDING PROGRESS**

Actuarial Valuation Date	Value of Plan Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b - a) / (c))
6/30/2011	\$ 285,580,631	\$ 634,379,401	\$ 348,798,770	45.0%	\$ 48,692,616	716.3%
6/30/2012	259,791,575	647,688,665	387,897,090	40.1	48,372,506	801.9
6/30/2013	241,800,328	651,580,654	409,780,326	37.1	45,256,202	905.5
6/30/2014	242,741,735	681,118,402	438,376,667	35.6	44,615,885	982.6
6/30/2015*	248,387,946	734,156,446	485,768,500	33.8	45,764,515	1,061.5
6/30/2016**	234,567,536	775,160,294	540,592,758	30.3	45,551,469	1,186.8

\* Discount rate changed from 7.75% to 7.50%

\* Discount rate changed from 7.50% to 6.75%

**INSURANCE BENEFITS  
SCHEDULE OF FUNDING PROGRESS**

Actuarial Valuation Date	Value of Plan Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b - a) / (c))
6/30/2011	\$ 123,687,289	\$ 438,427,763	\$ 314,740,474	28.2%	\$ 48,692,616	646.4%
6/30/2012	124,372,072	333,903,782	209,531,710	37.2	48,372,506	433.2
6/30/2013*	136,321,060	222,326,743	86,005,683	61.3	45,256,202	190.0
6/30/2014	155,594,760	234,271,127	78,676,367	66.4	44,615,885	176.3
6/30/2015**	167,774,940	254,838,710	87,063,770	65.8	45,764,515	190.2
6/30/2016	172,703,691	257,197,259	84,493,568	67.1	45,551,469	185.5

\* Discount rate changed from 4.50% to 7.75%

\*\* Discount rate changed from 7.75% to 7.50%



**INSURANCE BENEFITS  
SCHEDULE OF EMPLOYER CONTRIBUTIONS**

<b>Year Ended</b>	<b>Annual Required Contribution</b>	<b>Employer Contributions</b>	<b>Percentage Contributed</b>
June 30, 2011	\$ 25,772,574	\$ 11,050,964	42.9 %
June 30, 2012	28,246,786	11,960,468	42.3
June 30, 2013	27,234,229	16,828,681	61.8
June 30, 2014	20,879,022	14,493,242	69.4
June 30, 2015	9,889,797	10,381,881	105.0
June 30, 2016	8,552,633	10,237,021	119.7



The information presented in the required supplementary schedules was determined as part of the actuarial valuation at June 30, 2016. Additional information as of the latest actuarial valuation follows.

<b>Insurance Benefits</b>	
Valuation date	6/30/2016
Actuarial cost method	Entry Age
Amortization	Level Percent Closed
Remaining amortization period	27 years
Asset valuation method	5 Year Smoothed Market
Medical Trend Assumption (Pre-Medicare)	7.50% - 5.00%
Medical Trend Assumption (Post-Medicare)	5.50% - 5.00%
Year of Ultimate Trend	2021
Dollar Contribution Trend	1.50%
Actuarial assumptions:	
Investment rate of return*	7.50%
*Includes price inflation at	3.25%



## SCHEDULE A

### Valuation Balance Sheet and Solvency Test

The following valuation balance sheets show the assets and liabilities of the retirement system as of the current valuation date of June 30, 2016 and, for comparison purposes, as of the immediately preceding valuation date of June 30, 2015. The items shown in the balance sheet are present values actuarially determined as of the relevant valuation date.

#### VALUATION BALANCE SHEETS SHOWING THE ASSETS AND LIABILITIES OF THE STATE POLICE RETIREMENT SYSTEM

#### RETIREMENT BENEFITS

	JUNE 30, 2016	JUNE 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 234,567,536	\$ 248,387,946
Prospective contributions		
Member contributions	\$ 34,857,655	\$ 32,949,643
Employer normal contributions	41,787,398	30,925,190
Unfunded accrued liability contributions	<u>540,592,758</u>	<u>485,768,500</u>
Total prospective contributions	<u>\$ 617,237,811</u>	<u>\$ 549,643,333</u>
Total assets	<u>\$ 851,805,347</u>	<u>\$ 798,031,279</u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 630,842,308	\$ 601,295,055
Present value of benefits payable on account of active members	215,306,440	192,176,374
Present value of benefits payable on account of inactive members	<u>5,656,599</u>	<u>4,559,850</u>
Total liabilities	<u>\$ 851,805,347</u>	<u>\$ 798,031,279</u>



**VALUATION BALANCE SHEET  
INSURANCE BENEFITS**

	JUNE 30, 2016	JUNE 30, 2015
<b>ASSETS</b>		
Current actuarial value of assets	\$ 172,703,691	\$ 167,774,940
Prospective contributions		
Member contributions	\$ 1,699,282	\$ 1,558,766
Employer normal contributions	21,315,286	24,598,502
Unfunded accrued liability contributions	<u>84,493,568</u>	<u>87,063,770</u>
Total prospective contributions	<u>\$ 107,508,136</u>	<u>\$ 113,221,038</u>
 Total assets	 <u>\$ 280,211,827</u>	 <u>\$ 280,995,978</u>
<b>LIABILITIES</b>		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 171,154,508	\$ 165,675,982
Present value of benefits payable on account of active members	103,117,752	110,548,771
Present value of benefits payable on account of inactive members	<u>5,939,567</u>	<u>4,771,225</u>
 Total liabilities	 <u>\$ 280,211,827</u>	 <u>\$ 280,995,978</u>



The following tables provide the solvency test for SPRS members.

**Solvency Test  
Retirement Benefits**

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Reported Asset		
	(1)	(2)	(3)	Actuarial Value of Assets	(1)	(2)	(3)
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed Portion)				
6/30/2011	\$ 43,574,097	\$ 499,194,229	\$ 91,611,075	\$ 285,580,631	100.0%	48.5%	0.0%
6/30/2012	41,139,306	523,016,647	83,532,712	259,791,575	100.0	41.8	0.0
6/30/2013	39,788,421	535,720,195	76,072,038	241,800,328	100.0	37.7	0.0
6/30/2014	41,831,465	563,011,026	76,275,911	242,741,735	100.0	35.7	0.0
6/30/2015	41,567,127	605,854,905	86,734,414	248,387,946	100.0	34.1	0.0
6/30/2016	41,870,846	636,498,907	96,790,541	234,567,536	100.0	30.3	0.0

**Solvency Test  
Insurance Benefits**

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Reported Asset		
	(1)	(2)	(3)	Actuarial Value of Assets	(1)	(2)	(3)
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed Portion)				
6/30/2011	\$ 0	\$ 252,439,726	\$ 185,988,037	\$ 123,687,289	100.0%	49.0%	0.0%
6/30/2012	0	190,258,729	143,645,053	124,372,072	100.0	65.4	0.0
6/30/2013	0	139,508,590	82,818,153	136,321,060	100.0	97.7	0.0
6/30/2014	0	143,402,126	90,869,001	155,594,760	100.0	100.0	13.4
6/30/2015	0	170,447,207	84,391,503	167,774,940	100.0	98.4	0.0
6/30/2016	0	177,094,075	80,103,184	172,703,691	100.0	97.5	0.0



**SCHEDULE B**

**Development of Actuarial Value of Assets  
Retirement Benefits**

Valuation date June 30:	2015	2016	2017	2018	2019	2020
A. Actuarial Value Beginning of Year	\$ 242,741,735	\$ 248,387,946				
B. Market Value End of Year	246,968,144	217,594,068				
C. Market Value Beginning of Year	260,763,486	246,968,144				
D. Cash Flow						
D1. Contributions	37,836,413	30,971,333				
D2. Benefit Payments	(54,850,254)	(56,278,918)				
D3. Administrative Expenses	(201,108)	(177,910)				
D4. Investment Expenses	<u>(1,681,302)</u>	<u>(1,707,451)</u>				
D5. Net	(18,896,251)	(27,192,946)				
E. Investment Income						
E1. Market Total: B.-C.-D5.	5,100,909	(2,181,130)				
E2. Assumed Rate	7.75%	7.50%				
E3. Amount for Immediate Recognition	21,223,393	19,274,356				
E4. Amount for Phased-In Recognition	(16,122,484)	(21,455,486)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20*E4.	(3,224,497)	(4,291,097)	0	0	0	0
F2. First Prior Year	4,440,433	(3,224,497)	(4,291,097)	0	0	0
F3. Second Prior Year	983,544	4,440,433	(3,224,497)	(4,291,097)	0	0
F4. Third Prior Year	(3,810,203)	983,544	4,440,433	(3,224,497)	(4,291,097)	0
F5. Fourth Prior Year	<u>4,929,792</u>	<u>(3,810,203)</u>	<u>983,544</u>	<u>4,440,433</u>	<u>(3,224,497)</u>	<u>(4,291,097)</u>
F6. Total Recognized Investment Gain	3,319,069	(5,901,820)	(2,091,617)	(3,075,161)	(7,515,594)	(4,291,097)
G. Actuarial Value End of Year:						
A.+D5.+E3.+F6.	\$ 248,387,946	\$ 234,567,536				
H. Difference Between Market & Actuarial Values	\$ (1,419,802)	\$ (16,973,468)	\$ (14,881,851)	\$ (11,806,690)	\$ (4,291,097)	\$ 0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.



**Development of Actuarial Value of Assets  
Insurance Benefits**

Valuation date June 30:	2015	2016	2017	2018	2019	2020
A. Actuarial Value Beginning of Year	\$ 155,594,760	\$ 167,774,940				
B. Market Value End of Year	165,018,209	161,366,312				
C. Market Value Beginning of Year	165,167,805	165,018,209				
D. Cash Flow						
D1. Contributions	10,476,944	10,321,221				
D2. Benefit Payments	(13,482,044)	(13,862,503)				
D3. Administrative Expenses	(64,526)	(63,605)				
D4. Investment Expenses	<u>(1,185,520)</u>	<u>(1,391,722)</u>				
D5. Net	(4,255,146)	(4,996,609)				
E. Investment Income						
E1. Market Total: B.-C.-D5.	4,105,550	1,344,712				
E2. Assumed Rate	7.75%	7.50%				
E3. Amount for Immediate Recognition	13,867,077	13,632,904				
E4. Amount for Phased-In Recognition	(9,761,527)	(12,288,192)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20*E4.	(1,952,305)	(2,457,638)	0	0	0	0
F2. First Prior Year	1,873,504	(1,952,305)	(2,457,638)	0	0	0
F3. Second Prior Year	603,078	1,873,504	(1,952,305)	(2,457,638)	0	0
F4. Third Prior Year	(1,774,183)	603,078	1,873,504	(1,952,305)	(2,457,638)	0
F5. Fourth Prior Year	<u>3,818,155</u>	<u>(1,774,183)</u>	<u>603,078</u>	<u>1,873,504</u>	<u>(1,952,305)</u>	<u>(2,457,638)</u>
F6. Total Recognized Investment Gain	2,568,249	(3,707,544)	(1,933,361)	(2,536,439)	(4,409,943)	(2,457,638)
G. Actuarial Value End of Year:						
A.+D5.+E3.+F6.	\$ 167,774,940	\$ 172,703,691				
H. Difference Between Market & Actuarial Values	\$ (2,756,731)	\$ (11,337,379)	\$ (9,404,018)	\$ (6,867,579)	\$ (2,457,638)	\$ 0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.



**SCHEDULE C**

**STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS**

**The assumptions and methods used in the valuation were based on the actuarial experience study for the five-year period ending June 30, 2013, submitted April 30, 2014, and adopted by the Board on December 4, 2014.**

INVESTMENT RATE OF RETURN: 6.75% per annum, compounded annually for retirement benefits. 7.50% per annum, compounded annually for insurance benefits.

PRICE INFLATION: 3.25% per annum, compounded annually.

PAYROLL GROWTH: 4.00% per annum, compounded annually.

SALARY INCREASES: The assumed annual rates of future salary increases are as follows and include inflation at 4.00% per annum:

Service Years	Annual Rates of Salary Increases		
	Merit & Seniority	Base (Economy)	Increase Next Year
0-1	12.02%	4.00%	16.50%
1-2	7.21%	4.00%	11.50%
2-3	5.29%	4.00%	9.50%
3-4	4.33%	4.00%	8.50%
4-5	3.37%	4.00%	7.50%
5-6	2.40%	4.00%	6.50%
6-7	1.92%	4.00%	6.00%
7-8	1.92%	4.00%	6.00%
8-9	0.96%	4.00%	5.00%
9-10	0.48%	4.00%	4.50%
10 & Over	0.00%	4.00%	4.00%

DISABILITY: Representative assumed annual rates of disability are as follows:

Nearest Age	Annual Rates of Disability	
	Male	Female
20	0.05%	0.05%
30	0.09%	0.09%
40	0.20%	0.20%
50	0.56%	0.56%
60	1.46%	1.46%



RETIREMENT: The assumed annual rates of retirement are as follows:

Annual Rates of Retirement		
Service	Those Eligible for Service Retirement <sup>+</sup>	Those Eligible for Service Retirement <sup>++</sup>
20	22.00%	
21	22.00%	
22	22.00%	
23	28.00%	
24	28.00%	
25	28.00%	22.00%
26	28.00%	22.00%
27	28.00%	22.00%
28	44.00%	28.00%
29	44.00%	28.00%
30	44.00%	28.00%
31	58.00%	28.00%
32	58.00%	28.00%
33	58.00%	44.00%
34	58.00%	44.00%
35	58.00%	44.00%
36	58.00%	58.00%
37	58.00%	58.00%
38	58.00%	58.00%
39	58.00%	58.00%
40	58.00%	58.00%

+ For members participating before September 1, 2008. The annual rate of service retirement is 100% at age 55.

++ For members participating on or after September 1, 2008. The annual rate of service retirement is 100% at age 60.



WITHDRAWAL: The assumed annual rates of withdrawal are as follows:

Service Years	Annual Rates of Withdrawal
0-1	20.00%
1-2	7.00%
2-9	3.00%
9 & Over	2.50%

DEATH BEFORE RETIREMENT: The rates of mortality for the period before retirement are according to the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (multiplied by 50% for males and 30% for females).

DEATH AFTER RETIREMENT: The rates of mortality for the period after service retirement are according to the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (set back 1 year for females) for all healthy retired members and beneficiaries. The RP-2000 Combined Disabled Mortality Table projected with Scale BB to 2013 (set back 4 years for males) is used for the period after disability retirement. These assumptions are used to measure the probabilities of each benefit payment being made after retirement. These assumptions contain margin for mortality improvements.

PERCENT MARRIED: 100% of employees are assumed to be married, with the wife 3 years younger than the husband.

DEPENDENT CHILDREN: For hazardous members' duty-related death benefits, it is assumed that the member is survived by two dependent children each age 6.

FORM OF PAYMENT: Participants are assumed to elect a life-only form of payment.

ASSET VALUATION METHOD: Five-year market related actuarial value, as developed in Schedule B. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected actuarial value of assets, based on the ultimate assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected actuarial value.



**ACTUARIAL COST METHOD:** Costs were determined using the Entry Age Normal, Level Percentage of Pay Actuarial Cost Method. Under this method, a calculation is made for retirement benefits to determine the uniform and constant percentage rate of contribution which, if applied to the compensation of the average new member during the entire period of his or her anticipated covered service, would be required to meet the cost of benefits payable. Actuarial gains and losses are reflected in the unfunded actuarial accrued liability.

**MULTIPLE STATUS/MULTIPLE SYSTEM MEMBERS:** Some members may be represented under more than one retirement system and/or may have more than one status (e.g., active in one system, deferred vested in another and retired from a different system). For pension purposes, members that are active in one System but have service in another are assumed to retire from the System in which they are currently active. Any deferred pension benefits from another System are assumed to begin once the member terminates from their current active position. The insurance liabilities for multiple status/multiple system members are calculated assuming only one benefit is payable across all Systems and that benefit is payable from the combination of status and System which produces the highest economic value to the member.

**AFFORDABLE CARE ACT (ACA):** The impact of the Affordable Care Act (ACA) was addressed in this valuation. Review of the information currently available did not identify any specific provisions of the ACA that are anticipated to significantly impact results. While the impact of certain provisions such as the excise tax on high-value health insurance plans beginning in 2018 (if applicable), mandated benefits and participation changes due to the individual mandate should be recognized in the determination of liabilities, overall future plan costs and the resulting liabilities are driven by the assumed rate of health care inflation (i.e., trend). The trend assumption forecasts the anticipated increase to initial per capita costs, taking into account health care cost inflation, increases in benefit utilization, government-mandated benefits, and technological advances. Given the uncertainty regarding the ACA's implementation (e.g., the impact of excise tax on high-value health insurance plans, changes in participation resulting from the implementation of state-based health insurance exchanges), continued monitoring of the ACA's impact on the insurance liability will be required.

**HEALTH CARE BENEFITS VALUED:** Medical and drug benefits for retirees under age 65 and Medicare eligible.

**HEALTH CARE SPOUSE AGE DIFFERENCE:** Wives are assumed to be three years younger than husbands.

**HEALTH CARE COST TREND RATES:** Following is a chart detailing trend assumptions.

Year	Annual Rate of Increase		
	Under Age 65	Age 65 & Older	Dollar Contribution*
2016	7.50%	5.50%	1.50%
2017	6.75%	5.25%	1.50%
2018	6.25%	5.00%	1.50%
2019	5.75%	5.00%	1.50%
2020	5.25%	5.00%	1.50%
2021 & Beyond	5.00%	5.00%	1.50%

\* Applies to members participating on or after July 1, 2003



HEALTH CARE AGE RELATED MORBIDITY: For retirees ages 65 and older, per capita health care costs are adjusted to reflect expected health care cost changes related to age. The increase to the net incurred claims was assumed to be:

Participant Age	Annual Increase
65 – 69	3.00%
70 – 74	2.50%
75 – 79	2.00%
80 – 84	1.00%
85 – 89	0.50%
90 & Beyond	0.00%

Please note that for the retiree health care liabilities of those under age 65, the current premium charged by the Kentucky Employees' Health Plan (KEHP) is used as the base cost and is projected forward using the health care trend assumption. No implicit rate subsidy is calculated or recognized as the implicit rate subsidy is deemed the responsibility of the KEHP. Under Actuarial Standard of Practice No. 6 (ASOP No. 6), aging subsidies (or implicit rate subsidies) should be recognized, as the differences in health care utilization and cost due to age have been demonstrated and well quantified. The impact of aging on a valuation's results can be as significant as the use of mortality, trend, and discounting. It has been the long-standing position that the responsibility for compliance with GASB Statement No. 43, when it relates to KEHP implicit subsidies, rests with KEHP, not KRS, as KRS has no operational authority over KEHP. As such, KEHP implicit subsidies are excluded from the OPEB valuation process of the Retiree Medical Plan. As GASB 74 and 75 prohibit such a deviation from ASOP No. 6, additional consideration to the current treatment of KEHP implicit rate subsidies may be needed in the future. The estimated impact of KEHP implicit subsidies to the actuarial accrued liability is an increase of \$28,253,706 for SPRS.

HEALTH CARE DEFERRED VESTED BENEFIT RECIPIENT INITIAL AGE OF BENEFIT RECEIPT FOR MEMBERS: Health care benefits are assumed to begin at the following ages for deferred vested benefit recipients:

Deferred Vested Initial Age of Benefit Receipt		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
50	50	50



HEALTH CARE ANTICIPATED PLAN PARTICIPATION: Representative values of the assumed annual rates of member participation and spouse coverage are as follows:

Plan Elections of Covered Members Age 65 and Older as of January 1, 2017	
Kentucky Retirement System Health Plan	Hazardous
Medical Only	4.08%
Essential	4.64%
Premium	91.28%

Retirement Participation Rates			
Service at Retirement	Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
Under 10	100.00%	100.00%	100.00%
10 – 14	100.00%	100.00%	100.00%
15 – 19	100.00%	100.00%	100.00%
20+	100.00%	100.00%	100.00%

Disability/Death Participation Rates	
Members Participating Before July 1, 2003	
Duty-Disability	Duty Death-In-Service
100.00%	100.00%

Deferred Vested Member Participation Rates		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
100.00%	100.00%	100.00%

Members Electing Spouse Coverage		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
75.00%	75.00%	75.00%



HEALTH CARE MONTHLY PLAN COSTS: Assumed per capita health care costs were based on past experience and trended based on the assumptions. Following are charts detailing retiree per capita assumptions for the year following the valuation date. The amounts include medical and drug costs. Members under 65 are assumed to elect the LivingWell PPO. For retirees ages 65 and older, the full costs shown are before averaging. The average costs are then normalized to age 65 and age adjusted in calculating liabilities. The dollar amount contribution level is the cost to the system per year of service for members participating on or after July 1, 2003.

<b>Under Age 65 (KEHP) Full Costs as of January 1, 2017</b>				
<b>Tier Elected</b>	<b>LivingWell CDHP</b>	<b>LivingWell PPO</b>	<b>Standard PPO</b>	<b>Standard CDHP</b>
Single	\$ 702.10	\$ 721.14	\$ 678.22	\$ 663.80
Parent Plus	967.18	1,023.04	964.58	930.94
Couple	1,302.74	1,564.20	1,477.72	1,431.76
Family	1,453.94	1,738.40	1,640.22	1,594.52
Family C-R	810.00	865.64	815.50	793.18

<b>Age 65 and Older Full Costs as of January 1, 2017</b>	
Kentucky Retirement System Health Plan - Medical Only	\$162.47
Kentucky Retirement System Health Plan - Essential	77.76
Kentucky Retirement System Health Plan - Premium	252.51

<b>Age 65 and Older Average Cost as of the Valuation Date Based on Actual Retiree Elections</b>
<b>Hazardous</b>
\$234.37

<b>Dollar Amount Contribution Level Per Year of Service as of July 1, 2015</b>
<b>Applies to members participating on or after July 1, 2003</b>
<b>Hazardous</b>
\$19.48



**SCHEDULE D**

**SUMMARY OF MAIN BENEFIT AND CONTRIBUTION PROVISIONS**

This schedule summarizes the major retirement benefit provisions of SPRS included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

**Plan Year:** July 1 through June 30

**Normal Retirement:**

*Members whose participation began before 9/1/2008*

*Age Requirement* 55

*Service Requirement* At least one month of hazardous duty service credit

*Amount* If a member has at least 60 months of service, the monthly benefit is 2.50% multiplied by final average compensation, multiplied by years of service.

Final compensation is calculated by taking the average of the highest three (3) fiscal years of salary. If the number of months of service credit during the three (3) year period is less than twenty-four (24), one (1) or more additional fiscal years shall be used.

If a member has less than 60 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

*Age Requirement* 60

*Service Requirement* At least 60 months of hazardous duty service credit

*Amount* The monthly benefit is the following benefit factor based on service credit at retirement, multiplied by final average compensation, multiplied by years of service.

Service Credit	Benefit Factor
10 years or less	1.30%
10+ – 20 years	1.50%
20+ – 25 years	2.25%
25+ years	2.50%

Final compensation is calculated by taking the average of the highest three (3) complete fiscal years of salary. Each fiscal year used to determine final compensation must contain twelve (12) months of service credit.

If a member has less than 60 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.



**Normal Retirement (continued):**

*Members whose participation began on or after 1/1/2014*

<i>Age Requirement</i>	60
<i>Service Requirement</i>	At least 60 months of hazardous duty service credit or 25 or more years of service, with no age requirement
<i>Amount</i>	<p>Each year that a member is an active contributing member to the System, the member and the member's employer will contribute 8.00% and 7.50% of creditable compensation respectively into a hypothetical account. This hypothetical account will earn interest annually on both the member's and employer's contribution at a minimum rate of 4%. If the System's geometric average net investment return for the previous five years exceeds 4%, then the hypothetical account will be credited with an additional amount of interest equal to 75% of the amount of the return which exceeds 4%. All interest credits will be applied to the hypothetical account balance on June 30 based on the account balance as of June 30 of the previous year.</p> <p>Upon retirement the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or annuitized into a single life annuity option.</p>

**Early Retirement:**

*Members whose participation began before 9/1/2008*

<i>Requirement</i>	Age 50 with 15 years of service or any age with 20 years of service.
<i>Amount</i>	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 55 or has less than 20 years of service, whichever is smaller.

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

<i>Requirement</i>	Age 50 with 15 years of service or any age with 25 years of service.
<i>Amount</i>	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 60 or has less than 25 years of service, whichever is smaller.



**Disability:**

*Age Requirement*

None

*Service Requirement*

60 months (waived if in line of duty disability)

*Members whose participation began before 8/1/2004*

Normal retirement benefit except if the member's total service credit is less than 20 years, service credit will be added for the period from the last day of paid employment to the member's 55th birthday.

The maximum service credit added will not exceed the total service the member had on this last day of paid employment and the maximum service credit for calculating his retirement allowance, including total service and service added will not exceed 20 years. May not apply if eligible for an unreduced retirement allowance.

A member in a hazardous position who is disabled in the line of duty is entitled to the normal retirement benefit based on years of service and final compensation determined as of the date of disability (no penalty), except that the monthly retirement allowance payable shall not be less than 25% of the member's monthly final monthly rate of pay. Each dependent child shall receive 10% of the disabled member's monthly final rate of pay; however the total maximum dependent children's benefit shall not exceed 40% of the member's monthly final rate of pay.

*Members whose participation began on or after 8/1/2004 but before 1/1/2014*

Normal retirement benefit based on years of service and final compensation determined as of the date of disability (no penalty) or, if larger, 25% of the member's monthly final rate of pay.

*Members whose participation began on or after 1/1/2014*

The hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or an annuity equal to the larger of 25% of the member's monthly final rate of pay or the annuitized hypothetical account into a single life annuity option.



**Vesting:**

*Members whose participation began before 9/1/2008*

<i>Age Requirement</i>	None
<i>Service Requirement</i>	60 months. Service purchased after August 1, 2004 does not count toward vesting insurance benefits. Service purchased by employees who began participating on or after August 1, 2004 does not count toward vesting retirement benefits. Recontribution of refunds and omitted service purchases are the exception to this rule for service requirement.
<i>Amount</i>	Normal retirement benefit deferred to normal retirement age or reduced benefit payable at early retirement age.
<i>Normal Retirement Age</i>	55

*Members whose participation began on or after 9/1/2008 but before 1/1/2014*

<i>Age Requirement</i>	None
<i>Service Requirement</i>	60 months.
<i>Amount</i>	Normal retirement benefit deferred to normal retirement age or reduced benefit payable at early retirement age.

*Members whose participation began on or after 1/1/2014*

<i>Age Requirement</i>	None
<i>Service Requirement</i>	60 months.
<i>Amount</i>	Upon termination the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or the member can elect to leave the hypothetical account balance in the System. If the member does not withdraw the account balance, it will continue to earn 4% interest. Upon reaching normal retirement age the member can apply for retirement and receive the account balance as a lump sum payment or annuitize the account balance into a single life annuity.



**Pre-Retirement Death Benefit (not in line of duty):**

*Members whose participation began before 1/1/2014*

*Requirement* Eligible for Normal or Early Retirement, or any age in active employment with 60 months service, or any age and not in active employment with at least 144 months of service.

*Amount* Benefit equal to the benefit the member would have received had the member retired on the day before the date of death and elected a 100% joint and survivor form. Benefit is actuarially reduced if member is less than normal retirement age at the date of death.

*Members whose participation began on or after 1/1/2014*

*Requirement* 60 months service

*Amount* The maximum of the benefit equal to the benefit the member would have received had the member retired on the day before the date of death.

**Spouse's Pre-Retirement Death Benefit (in line of duty):**

*Requirement* None

*Amount* The spouse may choose (1) a \$10,000 lump sum payment and monthly payments of 25% of the member's final monthly rate of pay or (2) benefit options offered under death not in line of duty.

**Dependent Non-Spouse's Death Benefit (in line of duty):**

*Requirement* None

*Amount* The non-spouse may choose (1) a \$10,000 lump sum payment or (2) benefit options offered under death not in line of duty.

**Dependent Child's Death Benefit (in line of duty):**

*Requirement* None

*Amount* 10% of member's final monthly rate of pay. Dependent child payments cannot exceed 40% of the member's monthly final rate of pay.



**Post-Retirement Death Benefit:**

*Requirement*

Retired member in receipt of monthly benefit based on at least 48 months or more of combined service with KERS, CERS or SPRS.

*Amount*

\$5,000

**Member Contributions:**

*Members whose participation began before 9/1/2008*

8% of all creditable compensation. Interest paid on the members' accounts is currently set at 2.5% and per statute, shall not be less than 2.0%. Member entitled to a full refund of contributions with interest.

*Members whose participation began on or after 9/1/2008 and up to 1/1/2014*

9% of all creditable compensation, with 8% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Interest paid on the members' accounts will be set at 2.5%. Member entitled to a full refund of contributions and interest in their individual account, however, the 1% contributed to the insurance fund is non-refundable.

*Members whose participation began on or after 1/1/2014*

9% of all creditable compensation, with 8% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Member entitled to a full refund of contributions and interest on the member's portion of the hypothetical account, however, the 1% contributed to the insurance fund is non-refundable.



**Insurance Plan for Retirees:**

*Members whose participation began before 7/1/2003*

*Requirement*

In receipt of a monthly retirement allowance.

*Amount*

The Retirement System pays a portion of lifetime medical premiums for retirees, their spouse and their dependents based on the retired member's years of service credit. The percentage of the monthly contribution rate paid is show in the following table.

Service Credit	Percentage Paid*
0 – 3 years	0%
4 – 9 years	25%
10 – 14 years	50%
15 – 19 years	75%
20 or more years	100%

*\*100% of the monthly contribution is paid towards the health insurance for a member, member's spouse and dependents if the member is disabled in the line of duty as a result of a duty-related injury, regardless of actual service. 100% of the monthly contribution is paid toward health insurance for the spouse and dependent children of a member who dies in the line of duty regardless of the deceased member's service. The insurance benefit will be provided as long as the spouse and dependent children are eligible for a monthly retirement benefit.*

*Members whose participation began on or after 7/1/2003, but before 9/1/2008*

*Requirement*

Monthly retirement allowance with at least 120 months of service at retirement.

*Amount*

The Retirement System pays \$19.48 per month for each year of earned service for retirees. Upon the retiree's death, the surviving spouse will receive \$12.99 per month for each year of earned. These amounts are shown as of the valuation date and will be increased annually by 1.5%.

*Members whose participation began on or after 9/1/2008*

*Requirement*

Monthly retirement allowance with at least 180 months of service at retirement.

*Amount*

The Retirement System pays \$19.48 per month for each year of earned service for retirees. Upon the retiree's death, the surviving spouse will receive \$12.99 per month for each year of earned. These amounts will be increased annually by 1.5%.



**SCHEDULE E**

**DETAILED TABULATIONS OF THE DATA**

**Schedule of Retired Members Added to and Removed From Rolls  
Last Six Fiscal Years**

<b>Year Ending June 30</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
	<b><u>Number</u></b>					
Beginning of Year	1,223	1,263	1,299	1,346	1,413	1,460
Added	52	52	63	95	62	65
Removed	12	16	16	28	15	10
End of Year	1,263	1,299	1,346	1,413	1,460	1,515
	<b><u>Annual Allowances</u></b>					
Beginning of Year	\$ 45,515,797	\$ 47,467,404	\$ 49,887,093	\$ 50,905,789	\$ 53,432,446	\$ 54,930,421
Added	2,341,589	3,026,513	1,471,331	3,360,043	1,946,803	2,004,028
Removed	389,982	606,825	452,635	833,386	448,827	284,531
End of Year	\$ 47,467,404	\$ 49,887,093	\$ 50,905,789	\$ 53,432,446	\$ 54,930,421	\$ 56,649,918
% Increase in Allowances	4.29%	5.10%	2.04%	4.96%	2.80%	3.13%
Average Annual Allowance	\$ 37,583	\$ 38,404	\$ 37,820	\$ 37,815	\$ 37,624	\$ 37,393



Retired Lives Summary June 30, 2016

	Male Lives		Female Lives		Total	
	Number	Monthly Benefits	Number	Monthly Benefits	Number	Monthly Benefits
Basic Form	141	\$ 427,452.71	14	\$ 43,388.33	155	\$ 470,841.04
Straight Life (Old Plan)	0	0.00	0	0.00	0	0.00
Joint & Survivor						
100% to Beneficiary	139	452,417.42	1	4,813.66	140	457,231.08
66-2/3% to Beneficiary	87	331,153.53	2	7,541.82	89	338,695.35
50% to Beneficiary	84	306,283.87	1	2,604.67	85	308,888.54
Pop-up Option	569	2,026,012.48	4	10,805.22	573	2,036,817.70
10 Years Certain	4	9,873.45	0	0.00	4	9,873.45
10 Years Certain & Life	35	114,307.08	2	5,033.86	37	119,340.94
Social Security Option						
Age 62 Basic	30	78,635.67	0	0.00	30	78,635.67
Age 62 Survivorship	124	248,966.51	1	7,930.47	125	256,896.98
Partial Deferred (Old Plan)	0	0.00	0	0.00	0	0.00
Widows Age 60	0	0.00	0	0.00	0	0.00
Dependent Child	0	0.00	0	0.00	0	0.00
Refund	0	0.00	0	0.00	0	0.00
15 Years Certain & Life	17	47,678.40	1	3,918.67	18	51,597.07
20 Years Certain & Life	36	111,707.69	3	6,281.98	39	117,989.67
5 Years Certain	0	0.00	0	0.00	0	0.00
PLSO 12 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 24 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 36 Month Basic	0	0.00	2	466.41	2	466.41
PLSO 12 Month Survivor	6	20,781.22	0	0.00	6	20,781.22
PLSO 24 Month Survivor	4	5,952.60	0	0.00	4	5,952.60
PLSO 36 Month Survivor	9	16,914.11	0	0.00	9	16,914.11
<b>Total</b>	<b>1,285</b>	<b>\$ 4,198,136.74</b>	<b>31</b>	<b>\$ 92,785.09</b>	<b>1,316</b>	<b>\$ 4,290,921.83</b>



**Beneficiary Lives Summary June 30, 2016**

	Male Lives		Female Lives		Total	
	Number	Monthly Benefits	Number	Monthly Benefits	Number	Monthly Benefits
Basic Form	2	\$ 820.48	7	5,405.00	9	\$ 6,225.48
Straight Life (Old Plan)	0	0.00	0	0.00	0	0.00
Joint & Survivor						
100% to Beneficiary	6	5,883.26	59	157,344.64	65	163,227.90
66-2/3% to Beneficiary	2	1,206.05	11	22,098.48	13	23,304.53
50% to Beneficiary	0	0.00	18	28,031.94	18	28,031.94
Pop-up Option	1	478.19	37	97,651.92	38	98,130.11
10 Years Certain	1	2,038.06	1	2,038.06	2	4,076.12
10 Years Certain & Life	0	0.00	1	389.49	1	389.49
Social Security Option						
Age 62 Basic	0	0.00	2	2,281.46	2	2,281.46
Age 62 Survivorship	0	0.00	42	82,974.81	42	82,974.81
Partial Deferred (Old Plan)	0	0.00	0	0.00	0	0.00
Widows Age 60	0	0.00	0	0.00	0	0.00
Dependent Child	0	0.00	0	0.00	0	0.00
Refund	0	0.00	1	893.10	1	893.10
15 Years Certain & Life	0	0.00	1	721.26	1	721.26
20 Years Certain & Life	1	6,685.69	5	5,611.34	6	12,297.03
5 Years Certain	0	0.00	0	0.00	0	0.00
PLSO 12 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 24 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 36 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 12 Month Survivor	0	0.00	0	0.00	0	0.00
PLSO 24 Month Survivor	0	0.00	1	7,351.41	1	7,351.41
PLSO 36 Month Survivor	0	0.00	0	0.00	0	0.00
<b>Total</b>	<b>13</b>	<b>\$ 17,111.73</b>	<b>186</b>	<b>\$ 412,792.91</b>	<b>199</b>	<b>\$ 429,904.64</b>



**Retired and Beneficiary Information June 30, 2016  
Tabulated by Attained Ages**

Attained Age	Retirement		Disability Retirement		Survivors and Beneficiaries		Total	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 45	28	\$ 1,019,570	8	\$ 167,214	20	\$ 117,782	56	\$ 1,304,566
45-49	141	5,501,842	8	155,007	3	60,587	152	5,717,436
50-54	168	6,669,144	5	69,113	6	97,572	179	6,835,829
55-59	160	6,777,217	6	110,691	14	258,231	180	7,146,139
60-64	198	8,391,605	9	111,117	15	294,974	222	8,797,696
65-69	284	11,251,961	7	157,746	30	682,640	321	12,092,347
70-74	132	5,170,158	5	89,065	33	1,020,962	170	6,280,185
75-79	85	2,938,003	3	74,826	16	569,831	104	3,582,660
80-84	40	1,562,941	2	33,710	16	640,188	58	2,236,839
85-89	21	966,929	0	0	27	807,161	48	1,774,090
90 & Over	6	273,203	0	0	19	608,928	25	882,131
Totals	1,263	\$ 50,522,573	53	\$ 968,489	199	\$ 5,158,856	1,515	\$ 56,649,918



**Total Active Members as of June 30, 2016  
Tabulated by Attained Ages and Years of Service**

Attained Age	Years of Service to Valuation Date								Totals
	0-4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 26	27 - 29	30+	
Under 20 Avg Pay									
20-24 Avg Pay	49 \$26,192								49 \$26,192
25-29 Avg Pay	102 \$38,018	32 \$49,576							134 \$40,778
30-34 Avg Pay	69 \$41,536	82 \$47,981	27 \$52,629						178 \$46,188
35-39 Avg Pay	25 \$43,960	37 \$48,959	97 \$53,308	32 \$55,592	3 \$54,502				194 \$51,669
40-44 Avg Pay	16 \$42,054	16 \$51,264	55 \$53,348	71 \$58,366	29 \$66,629	3 \$72,725			190 \$56,430
44-49 Avg Pay	4 \$46,962	5 \$52,348	31 \$51,965	34 \$60,522	40 \$66,948	6 \$74,053	1 \$76,146		121 \$60,468
50-54 Avg Pay	1 \$27,984	3 \$48,793	11 \$52,645	5 \$56,774	8 \$66,531	2 \$63,081	1 \$82,902	1 \$99,538	32 \$58,693
55-59 Avg Pay		2 \$48,645	1 \$54,367	2 \$49,316				1 \$77,251	6 \$54,590
60-64 Avg Pay					1 \$74,419			2 \$76,895	3 \$76,070
65-69 Avg Pay								1 \$86,457	1 \$86,457
70 & over Avg Pay									
<b>Totals</b>	<b>266</b>	<b>177</b>	<b>222</b>	<b>144</b>	<b>81</b>	<b>11</b>	<b>2</b>	<b>5</b>	<b>908</b>
<b>Avg Pay</b>	<b>\$37,650</b>	<b>\$48,915</b>	<b>\$53,019</b>	<b>\$58,077</b>	<b>\$66,424</b>	<b>\$71,696</b>	<b>\$79,524</b>	<b>\$83,407</b>	<b>\$50,167</b>



## **SCHEDULE F**

### **SENSITIVITY ANALYSIS**

The valuation results are projections based on the actuarial assumptions. Actual experience will differ from these assumptions, either increasing or decreasing cost. The charts on the following pages provide a simple analysis on how the costs are sensitive to changes to the assumed discount rate, the assumed inflation rate and the rate of payroll growth. The charts show the actuarial accrued liability, the unfunded liability, the funded ratio and the employer contribution rate under the following scenarios:

- The discount rate assumption sensitivity analysis shows the valuation results with the baseline discount rate assumption, 6.75% (Pension) and 7.50% (Insurance), together with a decrease in the discount rate to 5.75% (Pension) and 6.50% (Insurance) and an increase in the discount rate to 7.75% (Pension) and 8.50% (Insurance). Under this scenario, the underlying inflation rate assumption is held constant at 3.25% and the payroll growth assumption is held constant at 4.00%.
- The inflation assumption sensitivity analysis shows the valuation results with the baseline underlying inflation rate assumption, 3.25%, together with decreases in the inflation rate to 3.00% and 2.75%. Under this scenario, the decrease in the underlying inflation rate assumption leads to corresponding decreases in the discount rate, the payroll growth assumption and the healthcare trend assumption for members hired before 7/1/2003.
- The payroll growth assumption sensitivity analysis shows the valuation results with the baseline underlying payroll growth assumption, 4.00%, together with decreases in the payroll growth assumption to 2.00% and 0.00%. Under this scenario, all other assumptions, including the individual member salary scale, are held constant so that the only impact is in the amortization of the unfunded liability, leading to higher employer contribution rates.



## ASSUMED DISCOUNT RATE SENSITIVITY ANALYSIS

	Decrease Discount Rate	Valuation Results	Increase Discount Rate
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 858,463,312	\$ 775,160,294	\$ 705,336,816
Actuarial Value of Assets	234,567,536	234,567,536	234,567,536
Unfunded Liability	\$ 623,895,776	\$ 540,592,758	\$ 470,769,280
Funded Ratio	27.32%	30.26%	33.26%
Contribution Rate	77.47%	71.57%	66.69%
Discount Rate	5.75%	6.75%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 290,891,533	\$ 257,197,259	\$ 229,660,924
Actuarial Value of Assets	172,703,691	172,703,691	172,703,691
Unfunded Liability	\$ 118,187,842	\$ 84,493,568	\$ 56,957,233
Funded Ratio	59.37%	67.15%	75.20%
Contribution Rate	22.98%	18.10%	13.79%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>SPRS Total</b>			
Actuarial Accrued Liability	\$ 1,149,354,845	\$ 1,032,357,553	\$ 934,997,740
Actuarial Value of Assets	407,271,227	407,271,227	407,271,227
Unfunded Liability	\$ 742,083,618	\$ 625,086,326	\$ 527,726,513
Funded Ratio	35.43%	39.45%	43.56%
Contribution Rate	100.45%	89.67%	80.48%
Discount Rate	5.75%/6.50%	6.75%/7.50%	7.75%/8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%



## INFLATION ASSUMPTION SENSITIVITY ANALYSIS

	Valuation Results	Decrease Inflation Rate 25 basis points	Decrease Inflation Rate 50 basis points
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 775,160,294	\$ 793,752,308	\$ 813,188,375
Actuarial Value of Assets	<u>234,567,536</u>	<u>234,567,536</u>	<u>234,567,536</u>
Unfunded Liability	\$ 540,592,758	\$ 559,184,772	\$ 578,620,839
Funded Ratio	30.26%	29.55%	28.85%
Contribution Rate	71.57%	74.42%	77.40%
Discount Rate	6.75%	6.50%	6.25%
Payroll Growth	4.00%	3.75%	3.50%
Inflation Rate	3.25%	3.00%	2.75%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 257,197,259	\$ 257,644,168	\$ 258,114,821
Actuarial Value of Assets	<u>172,703,691</u>	<u>172,703,691</u>	<u>172,703,691</u>
Unfunded Liability	\$ 84,493,568	\$ 84,940,477	\$ 85,411,130
Funded Ratio	67.15%	67.03%	66.91%
Contribution Rate	18.10%	18.24%	18.40%
Discount Rate	7.50%	7.25%	7.00%
Payroll Growth	4.00%	3.75%	3.50%
Inflation Rate	3.25%	3.00%	2.75%
<b>SPRS Total</b>			
Actuarial Accrued Liability	\$ 1,032,357,553	\$ 1,051,396,476	\$ 1,071,303,196
Actuarial Value of Assets	<u>407,271,227</u>	<u>407,271,227</u>	<u>407,271,227</u>
Unfunded Liability	\$ 625,086,326	\$ 644,125,249	\$ 664,031,969
Funded Ratio	39.45%	38.74%	38.02%
Contribution Rate	89.67%	92.66%	95.80%
Discount Rate	6.75%/7.50%	6.50%/7.25%	6.25%/7.00%
Payroll Growth	4.00%	3.75%	3.50%
Inflation Rate	3.25%	3.00%	2.75%



**PAYROLL GROWTH ASSUMPTION SENSITIVITY ANALYSIS**

	Valuation Results	Decrease Payroll Growth 2%	No Payroll Growth
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 775,160,294	\$ 775,160,294	\$ 775,160,294
Actuarial Value of Assets	<u>234,567,536</u>	<u>234,567,536</u>	<u>234,567,536</u>
Unfunded Liability	\$ 540,592,758	\$ 540,592,758	\$ 540,592,758
Funded Ratio	30.26%	30.26%	30.26%
Contribution Rate	71.57%	87.22%	105.30%
Discount Rate	6.75%	6.75%	6.75%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 257,197,259	\$ 257,197,259	\$ 257,197,259
Actuarial Value of Assets	<u>172,703,691</u>	<u>172,703,691</u>	<u>172,703,691</u>
Unfunded Liability	\$ 84,493,568	\$ 84,493,568	\$ 84,493,568
Funded Ratio	67.15%	67.15%	67.15%
Contribution Rate	18.10%	20.40%	22.96%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%
<b>SPRS Total</b>			
Actuarial Accrued Liability	\$ 1,032,357,553	\$ 1,032,357,553	\$ 1,032,357,553
Actuarial Value of Assets	<u>407,271,227</u>	<u>407,271,227</u>	<u>407,271,227</u>
Unfunded Liability	\$ 625,086,326	\$ 625,086,326	\$ 625,086,326
Funded Ratio	39.45%	39.45%	39.45%
Contribution Rate	89.67%	107.62%	128.26%
Discount Rate	6.75%/7.50%	6.75%/7.50%	6.75%/7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%